

# FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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## Flight

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## DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

May 20 to 30	Pan-American Aeronautic Congress at Atlantic City
May 22 and 23	Aviation Competition at Juvisy in connection with Fêtes de Paris
May 23 to 30	Seaplane Contests at Barcelona
June 22 ...	Wilbur Wright Memorial Lecture, H.R.H. Prince Albert presiding, at 8 p.m., at Central Hall, Westminster. Commander J. C. Hunsaker will read a paper on "Naval Architecture in Aeronautics"
July 9 to 20	S.B.A.C. International Aero Exhibition at Olympia
July (mid.)	Seaplane Contests at Antwerp
July 24 ...	Aerial Derby
Aug. 3 ...	Air Ministry Competition (Large and Small Type Aeroplanes)
Aug. (end of)	Schneider International Race, Venice
Sept. 1 ...	Air Ministry Competition (Seaplanes)
Sept. ...	International aviation week (with competitions) at Brescia, Italy
Sept. 27 to Oct. 3	Gordon-Bennett Aviation Cup, France
Oct. 22 ...	Gordon-Bennett Balloon Race, Indianapolis, U.S.A.

## EDITORIAL COMMENT



THE ideal which, some years ago, was the expression of the ultimate has become an accomplished fact. How often, in the early days of flight, have we not heard it prophesied that some day a business man would be able to breakfast in London, lunch in Paris and be back in London in time for dinner? Then it was the dream of the enthusiast. Now it is the actual accomplishment of a commercial company, the Aircraft Transport and Travel Co. One can leave Croydon aerodrome at 9.30 a.m., arrive in Paris before noon, and, after a four hours' stay, leave again at 4.30 and be back in London itself soon after eight o'clock. That is the effect of the latest Airco enterprise. New and faster machines have been put on the London-Paris route, and the journey between the two terminal aerodromes has been reduced to about two hours. Cars are in waiting at both ends, and it is thus possible to make the trip from Piccadilly Circus to the Place de l'Opéra in under four hours.

In any other age this would be a romance, but so blasé have we become with the piling up of wonders that it leaves the average person quite cold. It is all in the tale of the day's progress, and is accepted as nothing but what was to be expected. Perhaps it is better so, because the thing that is held to be wonderful has a tendency to stagnation, whereas the more matter of fact point of view does tend to spur on the inventor and the scientist to further efforts in the attempt to achieve something which will impress. In this way: that if the shortening of the journey to Paris to four hours is a commonplace, then perhaps a further shortening to two hours might be thought wonderful. There is a more material way of looking at it than this, however. The time distance between London and Paris has now been more than halved compared with the older methods of travel. That is a great deal to the good, but it goes deeper than that. It is now not a question of saving four hours on the journey, but of saving over a day and a great deal of discomfort in making a hurried business trip to the French capital. In making the quickest possible journey by any other method

of travel than by air, the business man would have to leave London by the night train, arriving at Paris in the early hours of the morning, after a most uncomfortable journey. If he were fortunate, he might get through his business in the forenoon and catch the afternoon boat-train back, arriving in London late in the evening, having spent some twenty hours in travelling in misery. Now he can travel comfortably by air and car, and his whole time of absence from town is about ten hours. We certainly look to such services as these to carry their own lesson to the business community, and thus to accomplish much good work of a missionary character, work that will do more to popularise aerial travel and to stabilise the industry than any amount of printed propaganda.

### Trade Through the Air

If actual progress in commercial aviation is slower than those who are engaged in its development would like, there are nevertheless signs that the appreciation of its possibilities is spreading. As an example, at the Inter-Parliamentary Commercial Conference, held in Paris last week, Mr. Kenneth Murchison, M.P., gave an address on "The Effect of Aerial Transport on International Commercial Relations," in the course of which he pointed out that the future of trade with such countries as Poland, Czecho-Slovakia, Roumania, Hungary and Jugo-Slavia would largely depend upon the rapidity with which representatives of nations like France and Great Britain, who were in a position to supply these new countries with manufactured goods, could reach them and negotiate with them for the sale of manufactured articles in exchange for whatever raw materials they might be prepared to export. He further pointed out that when Central Europe settled down to peace it would be of the utmost importance that regular aerial communications should be first established with success between those parts of the world where it was most necessary to improve commercial relations.

Undoubtedly this is sound doctrine, and should be translated into actuality with the least possible delay. The question that has to be settled is that of how best to set about the preliminaries. It is manifestly impossible for private enterprise to carry out the surveys of ground and conditions essential to the creation of services to and from the most vital points. This is the duty of the Government and the Air Ministry. There should be no particular difficulty or expense in it. It is for the consular service to indicate where trade conditions are most favourable, and then for the Air Ministry to assist by advice and information, which it can give through the knowledge of local conditions obtained by the intelligence branch. We do not suggest that the services should be created and maintained with grants from public funds, but we do think that there is no time to be lost in the collection and collation of the reports which will be necessary to scheming out the details. We know that a great deal of preliminary work has been done in outlying quarters of the world, and are, therefore, not disposed to ask for too much. The new States of Central Europe, however, have so many trade potentialities that we cannot afford to neglect them as possible markets for our products, and, moreover, it is certain that if we do not exploit them our late enemies will. That alone should be sufficient stimulus to special exertion.

### The Extension of Air Mails

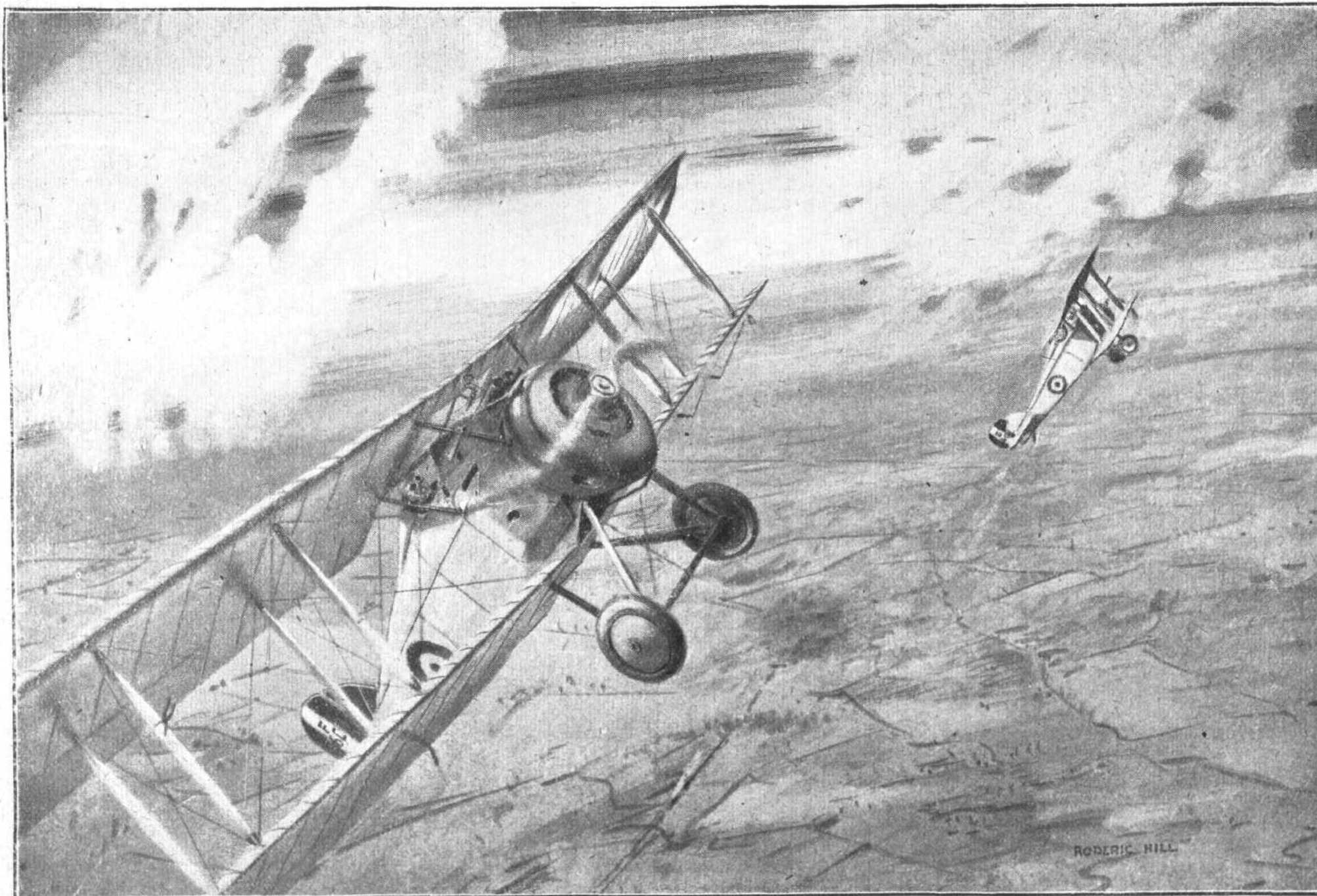
It is stated that within the next two or three months considerable extensions will be made in the aerial mail service to Paris. The services at present running have been fairly well patronised by the general public, though the want of publicity on the part of the postal authorities has kept down their success considerably. There is very little doubt that if these facilities had been better advertised than they have been much more advantage would have been taken of them. However, that is by the way. The changes recently carried out are, it is understood, intended as a test, and, if the success anticipated is met with, it is proposed to carry out a complete reorganisation of the service. Tenders will be invited, as was recently done in the case of the air mail to Holland, and a very considerable extension will take place. The whole thing turns on the amount of public patronage which may be forthcoming, but we may say at once that unless a proper amount of publicity is given to the postal facilities which these services afford, it is scarcely likely the public will do its part to ensure their success. Obviously, the business community cannot be expected to avail itself of services of which it has never even heard except in the most detached and casual way. What the Post Office seems to lack is a good publicity man.

The proposal to ask for tenders for the extended services may have an effect on the charges for the carriage of mails and passengers. Up to quite recently the London-Paris service was in the hands of two firms, the Airco enterprise and Messrs. Handley Page; but a short while since Messrs. Instones, Ltd., entered into competition, with machines capable of carrying 11 passengers or 1½ tons of goods. The effect of the competition has been that fares by aeroplane between the two capitals have already been slightly reduced, and it is obvious that if the new services are made the subject of competitive tender, the Post Office and the travelling public will get at least some slight amount of benefit. In connection with this subject of open tenders, it may be said that it is to be hoped the Post Office will think better of certain of the conditions laid down for the carrying out of the service between London and the Hague, upon which we commented at the time they were announced. The tenders for that service had to be in by Saturday last, but nothing has as yet transpired as to whether or not any of the aerial transport firms thought it good enough to compete in the circumstances, or, if they did, what terms they proposed to safeguard themselves against the drastic official requirements laid down in the conditions of the Post Office announcement. Unless these have been very much modified in the meantime, we are afraid we cannot see much progress being made towards the consummation of a regular mail service.

### A Drag on Development

Among the recent visitors to London, who have come over to discuss various problems connected with reconstruction after the War, is M. Flandin, the French Under-Secretary for Air, who came to London last week to talk over matters relating to the Franco-British Air Convention with the Air Ministry. It is understood that one of the principal subjects discussed was the check placed on development by the present attitude of the various European Governments, who insist that only pilots of their own respective nationality shall carry mails across their





ARMOURED SCOUTS ZOOMING. *From an original drawing by Roderic Hill*

own country. This is a matter to which we have referred on a previous occasion, when we pointed out the grave obstacle to progress which this requirement sets up.

It is this that is mainly responsible for delaying the institution of a service from England to India and the East. To make such a service effective it is obvious that pilots would have to fly over several European countries, and it is equally manifest that it would be out of the question for mail-carrying machines to land at every frontier to change to pilots who should be natives of the country next to be flown over. The whole thing is so patently absurd that we cannot help wondering why it should be necessary to discuss it at all. What is it that the several Governments fear if they allow pilots of a friendly nation to fly across their territory? Is it espionage? We can hardly think so, since it is perfectly easy for every country to do as we have done, and declare certain regions "out of bounds" for foreign—or their own—civilian pilots. Can it be the fear that by opening their aerial routes to all their competitors may secure business which should be their own? It would seem as though some such idea must be at the bottom of it, and that the refusal to allow mails to be carried by others than their own nationals is devised as a species of protection of the native aircraft industry. If that is so, we cannot help thinking that it is a very short-sighted, not to say foolish, view to take. What the modern world wants is improved and more rapid communications, and these can best be secured in the air. Our own view is that it does not really matter who constructs those new communications so long as they become effective, and that it will in the long-run be the nation with the most enterprise and which is willing to take the long chance that will succeed. We further believe that that nation will be Great Britain, but as to that the others have something to say. Who knows but what France, pioneer in aviation as she was, may not prove the commercial power in the air of the future? That is for the future to prove, but it cannot be proved at all if the Powers are going to place stupid obstacles in the way of development. It would be almost as logical to forbid foreign vessels to navigate in territorial waters save with native masters, officers and crew. That would indeed be a *reductio ad absurdum*, but it would be no worse than this childish prohibition of the carriage of mails in the air by other than native pilots. We do not know what the issue of the conversations between M. Flandin and the Air Ministry may have been, but we may at least express the hope that they have led to a modification of the attitude of the French Government at any rate. Once our good friend and ally has led, the way the rest will undoubtedly follow suit.

#### The First Service to Holland

On Monday last was inaugurated the latest enterprise of Aircraft Transport and Travel, Ltd., which has done so much to pioneer aerial transport, in the shape of a daily service from Croydon to Amsterdam. This must not be confused with the projected aerial mail service for which the Post Office has asked for tenders, and to which we have referred in a previous article. It is a completely independent service, depending for its success on the support of the travelling public and

the business community at large, whatever it may resolve itself into later. The pilot carried on his first journey a letter from the Lord Mayor to the Burgomaster of Amsterdam, conveying cordial greetings from the City of London to the City of Amsterdam, and expressing the hope that this service will go far to assist in increasing the friendly and business relations between the two cities and the two nations, to which hope we take leave to most cordially subscribe.

We need hardly say that we sincerely congratulate the A.T.T. Co. on this new evidence of their interest and faith in the future of aerial travel, or that we wish them every success in the new venture. Of the latter we are fully assured. Not only do we firmly believe in the aeroplane as the medium of swift travel between nations, but we go farther and completely believe in it as a commercially paying medium when it is applied to its purposes on businesslike lines such as has characterised previous enterprises of the Company and their allies. Apart altogether from any immediate commercial success which this new service may achieve we regard every such extension of aerial activity as one more missionary enterprise which is destined to do incalculable good to the future of aerial travel by reason of the constant advertisement it affords of the capabilities of the aeroplane to compete with the older forms of transport.

#### Air Clauses in the Turkish Treaty

The air clauses in the treaty recently presented to Turkey for acceptance, and published in FLIGHT last week, are even more drastic than those imposed on the other Powers of the enemy combination. Not only are the Turks forbidden to retain any military or naval air forces, and are compelled to surrender to the Allies all military aircraft in their possession or under construction, but they have to undertake to establish aerodromes in places to be designated by the Allied Powers for the use of the latter.

In this connection the significant phrase is used that the Allies "reserve the right in certain eventualities to take measures to ensure international aerial navigation over the territory and territorial waters of Turkey." This would appear to mean that what the Turk actually has to do is to provide the Allies with the aerodromes and facilities for meting out punishment to himself if he should elect to misbehave himself in the future. From all we have learnt of the Turk in the past, it is possible to say that he is not being treated any more hardly than he has deserved, or than circumstances warrant.

Turkey is not to be allowed to manufacture, import or export aircraft or their component parts for six months after the coming into force of the Treaty. Doubtless the clause relating to manufacture and export will not press very hardly, since Turkey has always depended upon her chosen friend, Germany, for aircraft supplies. The prohibition of import, however, effectually prevents Turkey from getting possession of any of the huge number of surplus machines in possession of Germany, and which the latter would doubtless be glad to pass on to her quondam ally—if they could be smuggled past the Allied Commission—for use against Armenia or any other kind of mischief the unspeakable Turk might contemplate.





## AIR MINISTRY NOTICES

### Prohibited Areas in Spain

THE Spanish Government has issued orders regarding areas over which flying is prohibited. All aircraft are forbidden to fly over the undermentioned zones or any point within 5 kiloms. of the boundaries of these zones:—

- (1) The town port and arsenal of Cartagena, up to the Island of Escombreras and Cape Tineso.
- (2) The (Spanish) Campo de Gibraltar, including the coast as far as a broken line which starts from Torrenueva to the north of La Linea de la Concepcion, passes through San Roque and Los Barrios, and ends at Punta del Fraile, Bay of Algeciras.
- (3) The town of Tarifa.
- (4) The Bay of Cadiz, the Island of Leon, and the Arsenal de la Carraca.
- (5) The Estuary of Vigo and seaward to the Cies Islands.
- (6) The Estuary Marin Y Pontevedra and seaward to the Isle of Oms.
- (7) The Estuaries of Ferrol and Ares.
- (8) The Island of Minorca.
- (9) The town of Ceuta.

These prohibited areas will be clearly shown on a map which will be published shortly by the Spanish Government. (A.M. Notice to Airmen No. 52).

### Air Mail Services to Holland

SCHIPHOL Aerodrome near Amsterdam, has been selected by the Dutch authorities as the Customs Aerodrome for Holland. (A.M. notice to Airmen No. 53).

### Aerodromes and Landing Grounds

THE Air Ministry has issued the following amendments to the consolidated list of Aerodromes issued on April 22:—

LIST C.—Stations temporarily retained for service purposes. The following have been deleted:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Bicester .. ..	Bicester .. ..	Bicester.
Coventry .. ..	Coventry .. ..	Coventry.
Eastleigh .. ..	Eastleigh .. ..	Eastleigh.
Shawbury .. ..	Hadnall .. ..	Shrewsbury.
Shrewsbury .. ..	Shrewsbury .. ..	Shrewsbury.
Ternhill .. ..	Ternhill .. ..	Market Drayton.

LIST D 3.—Aerodromes licensed as "suitable for Avro 504K and similar types of aircraft only."

Except in very few cases accommodation does not exist. The licences have been issued for limited periods only.

The following aerodromes are published as additions:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Town Moor, Conway	Conway .. ..	Llandudno.
Sands, Brynmill, Swansea.	Swansea (Brynmill).	Swansea.
Batcherby, Carlisle	Citadel, Carlisle	Carlisle.

Note.—In the consolidated List issued on April 22, the X shown against Yeovil in List D 2 should be deleted. Accommodation does exist. (A.M. Notice to Airmen No. 54.)

### Disbandment of "G" Reserve

THE Air Ministry announces that all Airmen in Class "G" of the Royal Air Force Reserve will be deemed to have been discharged as from April 30, 1920, and Army Form Z. 21, already in possession of Class "G" Reservists serving on "Duration of War" Engagements will constitute a final discharge certificate.

Airmen desiring this form stamped to show date of discharge from Reserve or a character of service, should apply to the Officer i/c Records, Blandford.

### R.A.F. Temporary Officers and New Rates of Pay

1. It has been decided that temporary officers of the Royal Air Force retained for duty beyond December 31, 1919, may, subject to the approval of the Air Council, be granted the option, with effect from January 1, 1920, of drawing either the rates of pay and allowances for which they have hitherto been eligible (that is, the "old" rates, excluding children allowance, but, including the Air Force of Occupation bonus until this is withdrawn generally) or those laid down for their substantive rank under the revised scheme of pay and allowances promulgated for officers granted permanent or short-service commissions. (A.M.W.O. 1003/19.) All officers who, under this decision, decide to accept the new rates of pay, will be subject, in regard to the surrender of pay for acting rank, to the same conditions as officers granted permanent or short-service commissions. The change will take effect from the same date as that from which their accounts are adjusted.

2. The option of transferring from the old to the new rates will be allowed only to officers who, throughout the period from January 1, 1920, to April 30, 1920 (or to the termination of their service if earlier) have rendered a proved effective service or have been on duly authorised leave or sick leave, or in hospital.

3. Officers transferring to the new rates will be paid according to their classification and sub-classification under the old scheme as stated below:—

a. Flying Branch .. ..	..	General Service rates under the new scheme.
Technical Branch .. ..	..	
(A) .. ..	..	
(B) (other than Stores)	..	
Administrative Branch .. ..	..	
(other than "Q" and "S" officers and officers employed in Pay Offices. .. ..	..	
b. Technical Branch .. ..	..	
(B) (Stores) .. ..	..	
Administrative Branch .. ..	..	
("Q" and "S" officers and officers employed in Pay Offices .. ..	..	
	Per diem. £ s.	
Flying Officer .. ..	0 19	
Flying Officer after 4 years on full pay in the substantive rank .. ..	1 1	
Flight Lieutenant .. ..	1 3	
Flight Lieutenant after 4 years on full pay in the substantive rank .. ..	1 5	
Squadron Leader .. ..	1 10	
Wing Commander .. ..	1 15	

c. Medical Officers: As laid down for medical officers in the new scheme. (This does not apply to Medical Officers serving under contract.)

d. Chaplains: As laid down for Chaplains in the new scheme, subject in certain cases to special conditions as regards effect on gratuity.

e. Staff Officers: Applications will be dealt with individually.

4. Arrangements are being made for the adjustment of pay and allowances in the case of officers serving on April 30, 1920. Officers who ceased to serve prior to that date should submit their claims for the new rates to the Secretary, Air Ministry (P. 4), giving (a) full Christian names and surname, (b) substantive rank (and acting rank if any), (c) classification and sub-classification, (d) unit last served with and duties therein.

5. This scheme does not apply to:—(a) Officers serving in India or Mesopotamia. From the date of embarkation from those countries for home service these officers will, however, be entitled to exercise the option allowed under paragraph 1 above. (b) Officers serving on engagements entitling them to gratuity at the rate of £150 per annum. (c) Cadets promoted to Second Lieutenant under Air Ministry Weekly Order 479/1919.

6. Officers will not be able to draw on the amounts due to them in connection with these adjustments until they have been advised by their agents that they have been actually placed to their credit.

### Ex-Airmen—Payment in lieu of Leave

ANY ex-airman who volunteered to serve for the Occupation Period (1 year), or who re-engaged for periods of approximately 2, 3 or 4 years under the "Bounty" system, and so became eligible for 1, 2 or 3 months' leave, may, if the exigencies of the service did not permit of his receiving such leave prior to demobilisation or discharge, now receive 28, 56 or 84 days' pay and allowances under the following conditions:—

(1) That he was not discharged for misconduct.

(2) That if he has been invalided and granted a pension he will receive only the difference, if any, between the pension he has already drawn during the period covered by the leave to which he is entitled and the pay and allowances for the same period.

Applications for this leave should be made as early as possible to the Officer in Charge of Records, Royal Air Force, Blandford, and must in any case be made within three months of the date of this announcement. Any application which is not made within this period cannot be considered.

It must be clearly understood that any sums so payable are liable to be held against any issue of pension in respect of the period for which leave is now granted, or to meet any other public claim against the airman concerned.

Investigations of the numerous claims for this leave may possibly involve some delay in settlement, but all sums due will be remitted as early as practicable, without further applications from the airmen concerned.

F = N.T. "America" as built to suit requirements of Technical Director.  
 G = Original Curtiss "America."  
 H = Finally altered to writer's original design after building

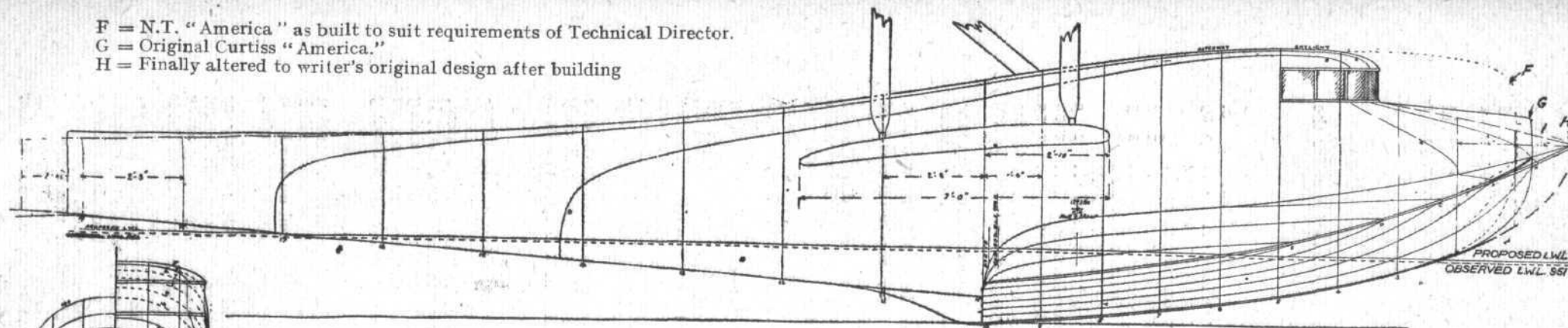


FIG. 1.

0 1 2 3 FEET

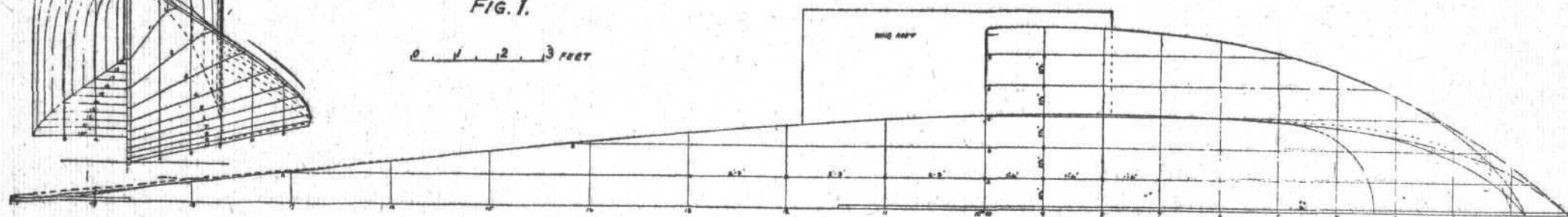
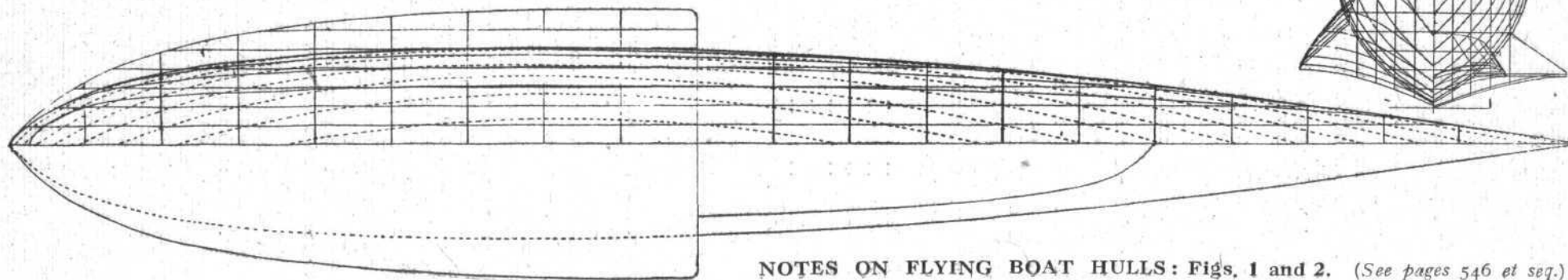
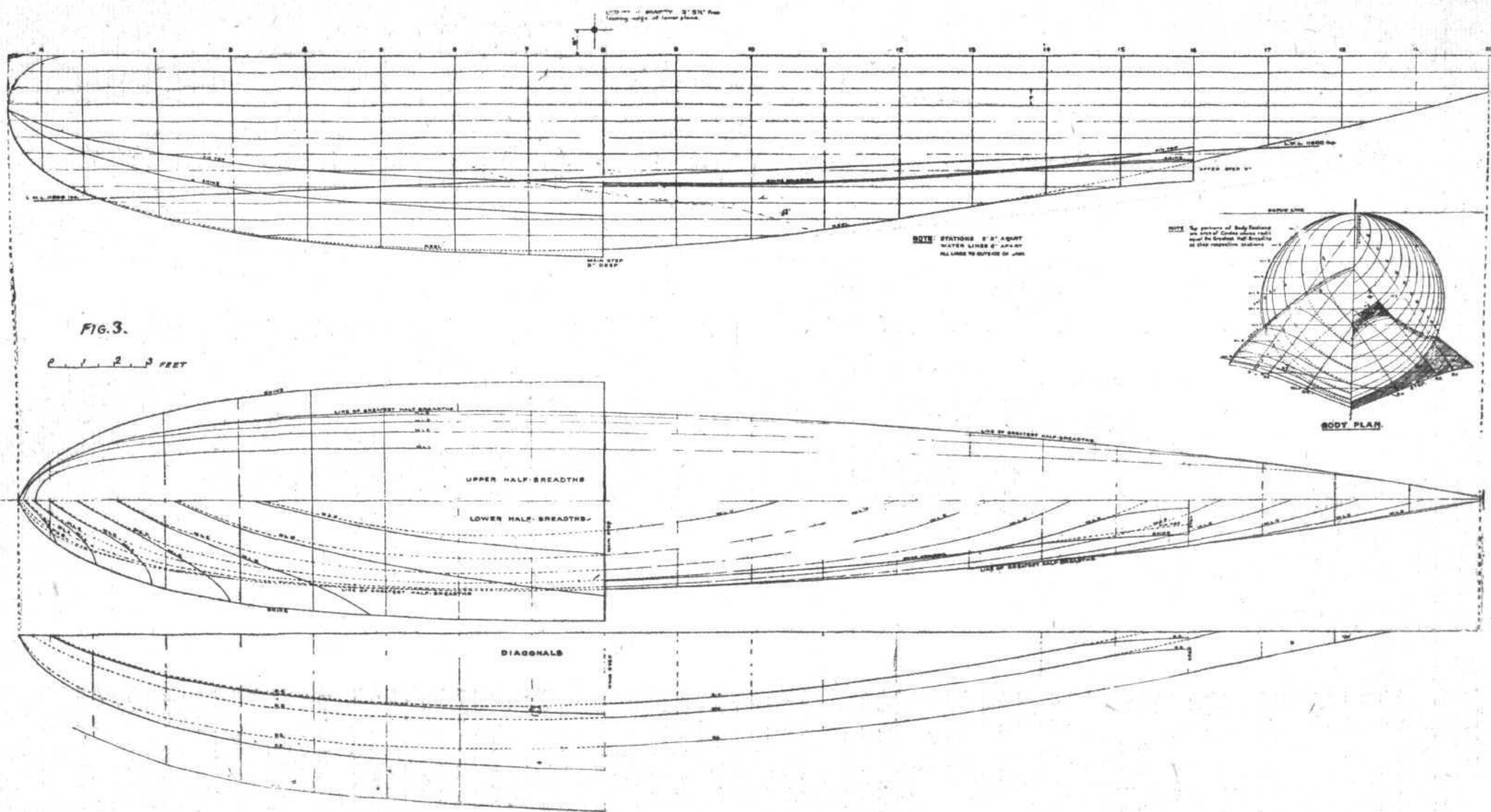


FIG. 2



NOTES ON FLYING BOAT HULLS: Figs. 1 and 2. (See pages 546 et seq.)





NOTES ON FLYING BOAT HULLS: Fig. 3.—The lines of "P.5" (Phoenix Cork). Note.—The stations are 2 ft. 3 ins. apart, and the water lines 6 ins. apart ; all lines to outside of skin. The top portions of the body sections are arcs of circles, whose radii equal the greatest half-breadths at their respective stations. (See pages 546 et seq.)

# NOTES ON FLYING BOAT HULLS\*

By Major LINTON HOPE, M.I.N.A., F.R.Ae.S., Consulting Naval Architect to H.M. the King of the Belgians and to the Air Ministry.

BEFORE proceeding with these notes the writer wishes to apologise for their meagreness and the errors due to insufficient checking of figures given, as there has only been a little over two weeks to prepare the paper, which was originally intended for the autumn programme. It must also be understood that it is written entirely from the naval architect's point of view for the designers and constructors of the boats. The writer claims no special knowledge of aeronautics beyond the smattering acquired during his service with the Air Department, Admiralty, and the present Air Ministry, also he does not pretend to any great knowledge of mathematics, but has spent most of his life in seeking after lightness of construction in racing yachts, etc.

He has always found that careful tabulation of the data of each design made, and of all the successful competitors (when obtainable), not only simplifies decisions on the elements of future designs, but gradually enables one to evolve certain formulæ to assist the designer, both in comparison of the actual elements of existing vessels and the probable performance.

## A New Design

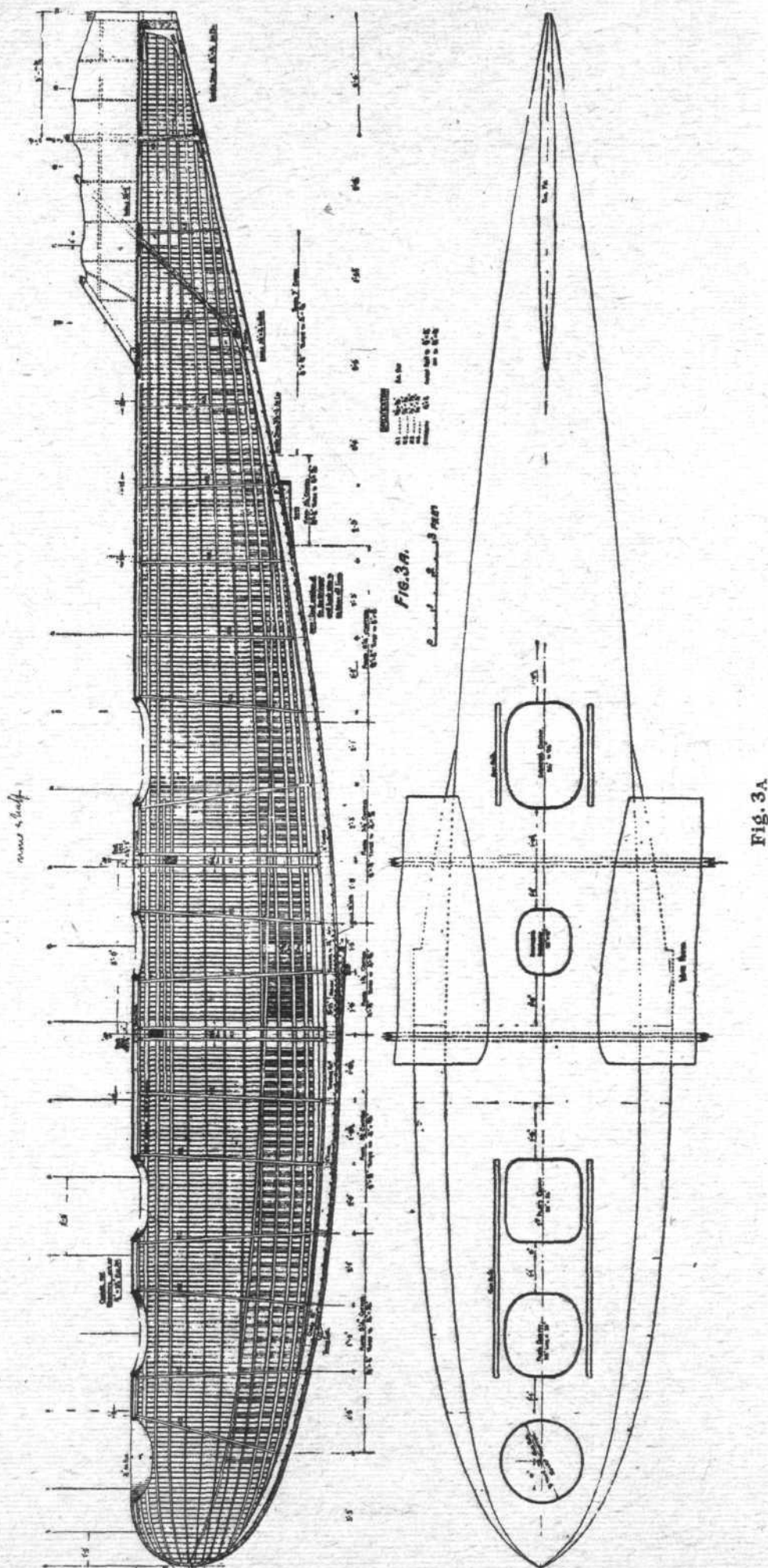
When he first joined the Technical Department at the Admiralty, early in 1915, he had no experience whatever of flying boats, but for some years past had been making a careful study of the hydroplane boat, and he was much surprised when he saw the first Curtiss "America" (Fig. 1) Flying Boat at Felixstowe. Not only was she extraordinarily heavy and badly built, but in addition she was a very poor hydroplane, owing to the form of her tail and enormous wetted surface for her low power.

All who had to do with these boats will remember their great reluctance to leave the water, and it was entirely due to the skill and perseverance of the late Commander J. C. Porte, R.N.A.S., as he then was, that the flying boats were developed from this extremely crude beginning, into a large fleet of greatly improved boats, which kept up a continuous aerial patrol in the North Sea and elsewhere throughout the War.

As a naval architect, and especially as a student of light construction, it may be that the writer did not always see eye to eye with the Felixstowe designs, and especially the methods of construction, but considering that Commander Porte was a complete amateur, both as a naval architect and boat-builder, it is marvellous that he succeeded in developing the flying boat until the flying weight was increased some six times that of the original "America," and the whole world was convinced that flying boats were really practical machines, superior for many purposes to either the airship or ordinary aeroplane.

Although the writer's original work with the Admiralty

\* Paper read before the Royal Aeronautical Society at the Royal Society of Arts, on May 12th.





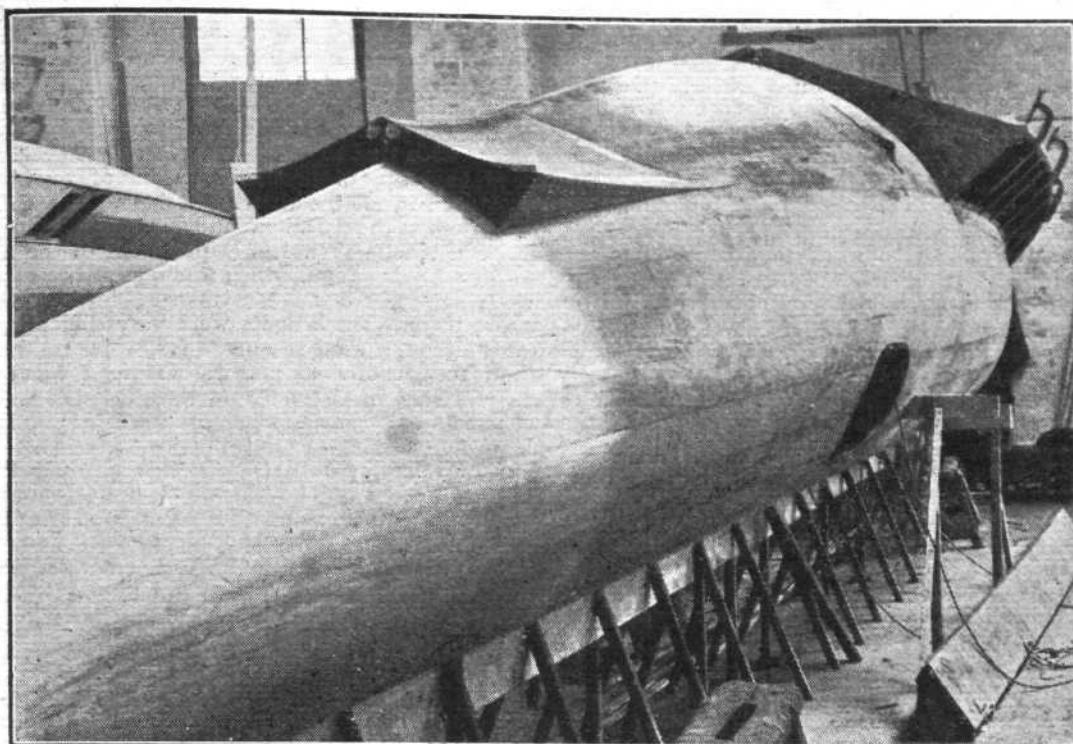


Fig. 4: Photo. of steps

consisted entirely of the inspection and structural criticism of flying boats and floats, through the kindness of his C.O., Wing-Com. Randall (who also gave him most valuable suggestions as to parts of the flexible construction) he was permitted in 1916 to get out a design for an experimental flying boat (Fig. 2) of 41 ft. in length, 620 h.p., with a total flying weight of 10,000 lbs. on 10 hours' fuel. A model was made from this design and thoroughly tested at the N.P.L. experimental tank, both under varying loads of 7,000, 10,000, 13,000 and 16,000 lbs., the latter being, of course, absurdly excessive for a boat of this size. She was also tried with three different widths of planing bottom, 7 ft.—as designed—5 ft. 9 ins. and 3 ft. 6 ins., the latter being obviously as impossible as the 16,000 lbs. weight. These tests proved the original weight and beam to be correct, but although approved by the Director of Air Services, it was turned down by the then Technical Director. However, a somewhat similar design of the writer's of 45 ft. and 12,000 lbs. weight (Figs. 3 and 3a), P.5, has been built and proved herself an excellent sea boat, especially in absence of alighting shock. The hull is considerably lighter than the standard Felixstowe F. type of the same length and power, and she is stated to be handier in many

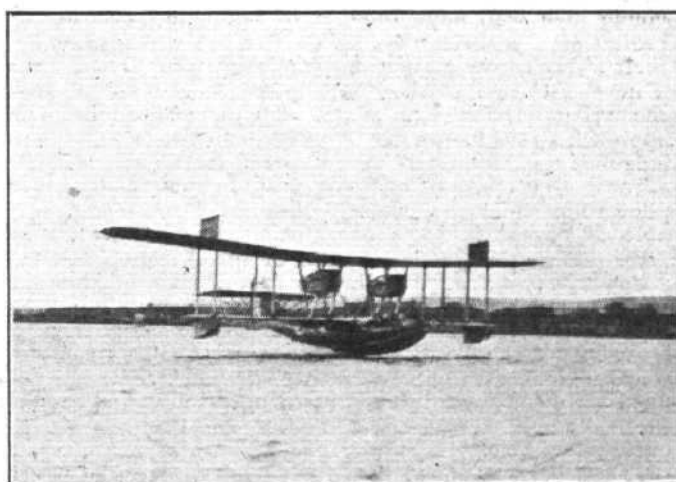
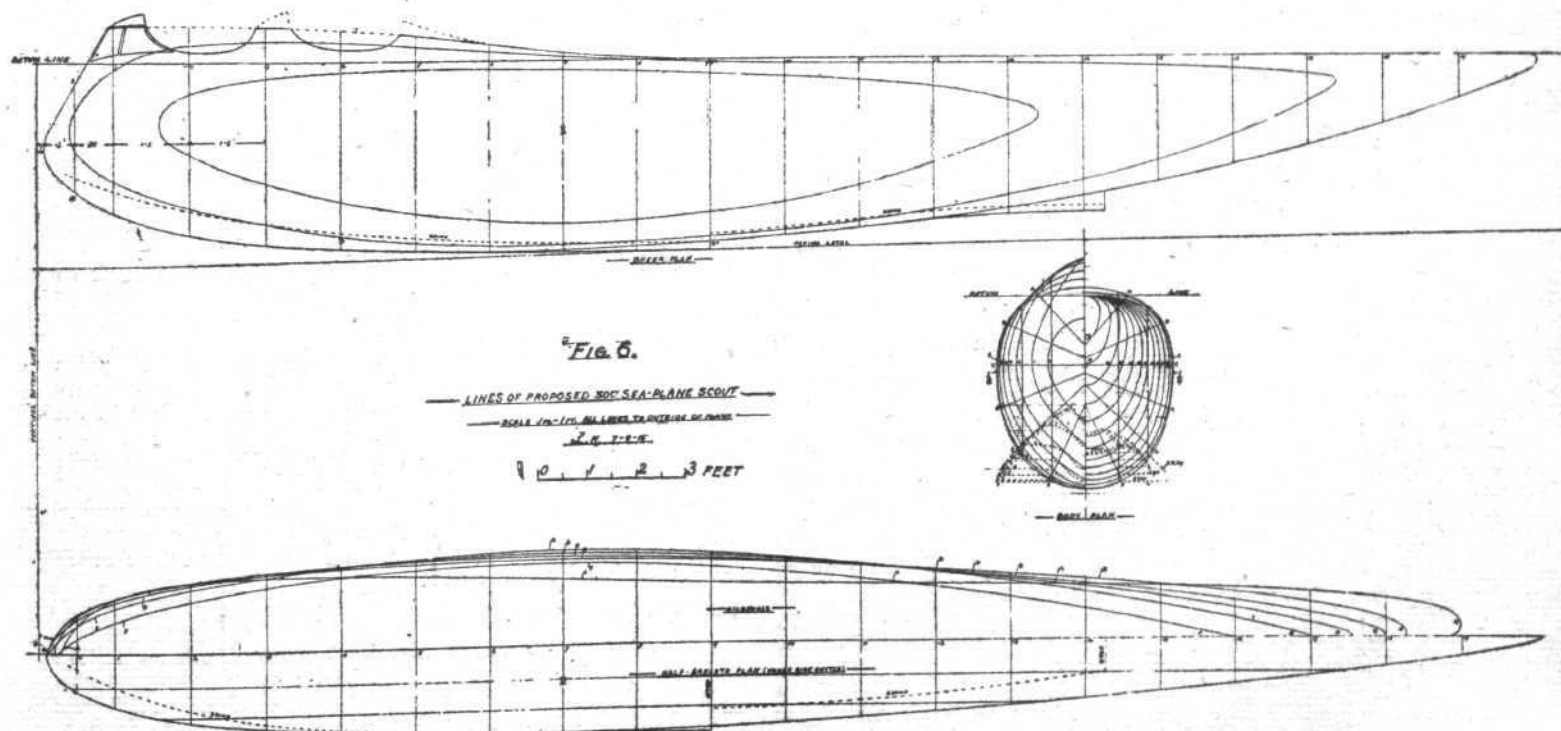


Fig. 5: Boat on water



ways. Maj. M. Wright, who was the first to fly this boat, will, I hope, give you his opinion from the pilot's point of view. Photograph (Fig. 4) shows one of these hulls when completed in the builder's yard, and Fig. 5 shows one of these machines getting off. It may be mentioned here that neither of the forms shown in the photographs were what the writer should have designed if he had had a free hand, and he would here like to make what the Navy terms a small "moan" on the difficulties of producing a successful design or making efficient progress when one always had to work to other people's ideas. In this case it was with great difficulty that he was able to slightly hollow the transverse section of the second boat, and to move the rear steps further aft than was customary with the Felixstowe type. In the first boat the step was a true V without any transverse hollow as in the F. type and had the same angle of 20° to the horizontal. All the tank experiments have shown that a hollow section, especially at the chine or fin-edge edge, not only throws down a lot of water and spray, but is a more efficient form, and in the latest designs this hollow is considerable and has proved equally successful both in tank experiments and actual boats.

The hollow main step section was apparent in the 41 ft. design (Fig. 2), but at that time very little was known with regard to the best form and position of the rear step. In this design the step was too far forward, too flat, and the pointed after-end was entirely wrong. This latter form was merely

shown tentatively in the design, with the object of fitting a water rudder to it, if found desirable, and it was at once cut off square for the series of tank experiments, as soon as it was proved to be detrimental, which was previously suspected by the designer. The position of the rear step was more or less in accordance with that of the 30 ft. A.D. boat (Fig. 6) which was the first example of the flexible system of construction, afterwards used in all the writer's designs. The form of the planing bottom of the A.D. boat and its general proportions were designed by the Technical Department of the Air Service, based on a 50 ft. design, which was one of the early N.P.L. models (No. 135, I believe), with the addition of a much longer fore body. These boats were very difficult to get off the water although good sea boats for their size, and with later experience it is obvious that the main step was too far aft and the rear step much too far forward, also it should not have been connected to the main step by the after planing bottom. The angle formed by a tangent drawn from step to step and the forward planing bottom was too small, with the result that the boat could not be thrown back far enough to give the full amount of incidence to the planes to get her off properly. In spite of these faults in design, the A.D. boats showed the great strength of the flexible construction, and some bending and crushing tests carried out at the R.A.E. works at Farnborough show what they were able to resist.

(To be continued.)

## A "CAREER" INSURANCE

ONE risk which has proved a stumbling-block to several young men who have thought of taking up aviation as a profession, has been that of an accident which should end their flying career and render it necessary for them to make a new start in life after having spent their all in making themselves proficient as pilots. Up to recently the nearest approach to an insurance to meet such a case has been an indemnity paid only if permanently totally disabled from all active occupation, but this fails to meet the case of a pilot who, while permanently disabled from flying, is yet able to engage in some other occupation. This has been recognised by Major H. Barber, of the Aviation Insurance Association, and he has therefore devised a scheme under which a pilot may insure against death, permanent total disablement from all active occupations, or permanent total incapacity from flying, while it is also possible to ensure a weekly compensation for twenty-six weeks. There is no fixed tariff, but every risk is rated upon its merits, and from the specimen rates quoted to us they certainly appear to be quite reasonable.

It has been arranged that the premiums may be payable monthly, and the payment of eight consecutive monthly premiums entitles the holder to a further four months' insurance free from the payment of any further premiums.

In this way the total annual premium will be paid off at the expiration of eight months, and no further premiums will be required for the year concerned. Under this arrangement pilots are given the advantage of discontinuing the insurance at any time, if they should desire to do so, and they are under no circumstances liable for the continuation of the monthly payments. Three days' grace is allowed for the payment of each month's premium, and if it is not received within that period, the insurance automatically lapses.

If it is considered more convenient to pay for a year's insurance in advance, then the premium payable will be eight times the monthly premium (less the special discount of 10 per cent.), and should the pilot, having made no claim under the policy, decide to give up flying, a return of premium will be made in respect of the unexpired portion of the policy, which will have the effect of placing the pilot in the same position as if he had accepted the monthly arrangement and had, under it, allowed his insurance to lapse as from the end of the monthly period of insurance during which he had notified his decision to discontinue flying.

Further details as to premiums, etc., can be obtained from the Aviation Insurance Association, 1, Royal Exchange Avenue, E.C.2.

### Fights on Palestine Border

A SEMI-OFFICIAL account of the disturbances on the Syrian-Palestinian border states that on May 7 a British aeroplane was compelled to land east of Lake Tiberias. The machine was burnt by the Arabs, but the officers were sent back to Semakh unhurt.

### Royal Flight to Belgium

THE King and Queen of the Belgians left Croydon aerodrome and returned to Belgium on May 12 by way of the air. Three D.H.4 aeroplanes were used, and a successful journey was reported, the start being made at 4 p.m., Lympne being passed at 4.30, while Brussels was reached at 5.51. There was some delay in reporting the arrival due to an atmospheric storm, which rendered signalling practically impossible.

### A Bristol Aeroplane for King Albert

ON May 14 the King of the Belgians visited the Evere aerodrome, near Brussels, and was presented by Messrs. Handley Page and Co., Ltd., with a new Bristol Fighter aeroplane fitted with a Rolls-Royce Falcon 275 h.p. engine. The machine was flown to Brussels from Cricklewood on the previous day by Major Woods Humphrey, the head of the H.P. Transport Dept., who was accompanied by Lieut. T. Capps and Mr. J. Richard. Brussels was reached in 1 hour and 45 minutes, the distance being covered at the rate of more than 120 miles an hour.

In handing over the machine Major Woods Humphrey said the industry was deeply indebted to King Albert for his direct assistance, in using the aeroplane for his journeys.

The King expressed his thanks to Messrs. Handley Page for their gift.

After an exhibition of flying by Lieut. Capps, Major Woods Humphrey took King Albert up for a flight over Brussels. Asked whether he would like any alterations in the machine, King Albert said that he would like a dual ignition and a larger petrol tank, in order to make longer flights. The machine returned to Cricklewood on Saturday, and as soon as the alterations have been made it will be flown back to Brussels.

### Zeppelins over Warsaw

FROM Warsaw comes a story that the military authorities there were informed by the police stations that on the night of May 9 (Sunday), seven Zeppelins were seen going in an easterly direction. They were described as being in one group of six, with the seventh following at a distance, and it is surmised that the Zeppelins were carrying German staff Officers to the Bolshevik front. Complaint is made by the Poles that this is a violation of the terms of the Peace Treaty by Germany. The German Foreign Office states that there is no foundation for the report.

### The German Air Force

FOLLOWING on the semi-official announcements issued from Berlin regarding the disbandment of the aerial forces, it was semi-officially announced in Berlin, on May 11, "that the entire German Army Air Force has been disbanded, and the Army no longer possesses any military aeroplanes."



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## THE FLYING SERVICES FUND COMMITTEE

A MEETING of the Flying Services Fund Committee was held on Monday, May 10, 1920, when there were present:— Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., in the Chair, Lieut.-Col. Alan Dore, D.S.O., Mr. Chester Fox and the Secretary.

**Applications for Assistance.**—Forty-two applications for assistance were considered, and Grants and Allowances were voted amounting to £559 4s. 4d.

## COMMITTEE MEETING

A Meeting of the Committee was held on Wednesday, May 12, 1920, at 5.15 p.m., when there were present:— Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Wing-Commander John D. Dunville, R.A.F., Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., Col. F. Lindsay Lloyd, C.M.G., C.B.E., Lieut.-Col. Alec Ogilvie, Mr. F. Handley Page, Group-Captain C. R. Samson, C.M.G., D.S.O., R.A.F., Sir Mortimer Singer, K.B.E., J.P., and the Secretary.

**Flying Services Fund.**—The report of the Meeting of the Flying Services Fund Committee held on May 10, 1920, was received and adopted.

**Certificates of Performance.**—The following Certificates of Performances were granted:—

### Certificate of Performance

(Under the Regulations of the Fédération Aéronautique Internationale)

#### CLASS "C" 5.

Type .. ..	Handley Page W. 8.
Constructor .. ..	Handley Page, Ltd., Cricklewood, London, N.W. 2.
Motors .. ..	Two Napier "Lion," 450 h.p. each.
Pilot .. ..	Capt. G. T. R. Hill.
Place .. ..	Handley Page Aerodrome, Cricklewood, London, N.W. 2.
Date .. ..	Tuesday, May 4, 1920, at 12.30 p.m.

#### Performance

Useful load carried .. ..	1,674 kilogs. (= 3,690 lbs.).
Duration .. ..	1 hour 20 minutes.
Height attained .. ..	4,267 metres (= 13,999 ft.).

### Certificate of Performance

(Under the Regulations of the Fédération Aéronautique Internationale)

#### CLASS "C" 4B.

Type .. ..	Martinsyde "Semi-Quaver."
Constructor .. ..	Martinsyde, Ltd., Woking.
Motor .. ..	300 h.p. Hispano-Suiza.
Pilot .. ..	Mr. F. P. Raynham.
Place .. ..	Martlesham Heath, Suffolk.
Date .. ..	March 21, 1920.

#### Performance

Greatest speed over a straight line course of 1 kilometre: 259.75 kilometres per hour (= 161.434 miles per hour).

## African Fliers Honoured

It was announced on May 14 that the King has been pleased to give orders for the following appointments to the Order of the British Empire, in recognition of the valuable services rendered to aviation by the successful flight from England to Cape Town, South Africa:—

K.B.E. (Civil Division)

Lieut.-Col. Hesperus Andrias Van Ryneveld, D.S.O., M.C., late Royal Air Force.

Flight-Lieut. Christopher Joseph Quintin Brand, D.S.O., M.C., D.F.C., Royal Air Force.

The King has been pleased to award the Air Force Medal to No. 2842 Flight-Sgt. Ernest Frank Newman, 58 Squadron, Royal Air Force; and to

Mr. Frank William Sherratt, Engineer, of Messrs. Rolls-Royce, Ltd., Motor Car and Aero Engine Manufacturers, in recognition of their valuable services during the recent successful flight to Cape Town.

## "DAILY EXPRESS" £10,000 PRIZE FLIGHT TO INDIA AND BACK

The following letter has been received from the Air Ministry:—

May 11, 1920.

### Competition Flight to India

"With reference to the competitive flight from Great Britain to India and back now being organised in connection with the *Daily Express*, I am commanded by the Air Council to inform you that a telegram has been received from the Air Officer Commanding, Royal Air Force, Middle East, to the effect that, in view of the existing strained relations with the Arabs, it is considered undesirable to fly from Bere Sheba across the desert.

"It is understood that conditions may be somewhat more favourable for machines proceeding via the French Base at Damascus, but I am to suggest that competitors be warned that there is a possibility that it may be found necessary to prohibit them from proceeding across the desert either from Bere Sheba or via Damascus, and that if they start from England, they must do so on their own responsibility."

In view of this communication, the start for the above prize has been postponed.

## THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916.)

Administered by the Royal Aero Club.

For the benefit of Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

### Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

### Committee:

H.R.H. PRINCE ALBERT, K.G. (Chairman).  
Lieut.-Col. A. DORE, D.S.O.  
Mr. CHESTER FOX.  
Squad.-Leader T. O'B. HUBBARD, M.C., R.A.F.  
Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

### Secretary:

H. E. PERRIN.

### Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

### Subscriptions

	£	s.	d.
Total subscriptions received to April 19, 1920 .. ..	17,028	5	2
Capt. E. V. Sassoon .. ..	100	0	0
Maj. P. Litherland Teed (4th contribution) .. ..	5	0	0

Total, May 17, 1920 .. .. £17,133 5 2

Offices: THE ROYAL AERO CLUB,  
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

## New Member of the Air Council

The Secretary of State for Air has appointed Rear-Admiral Cecil F. Lambert to be an additional member of the Air Council.

Rear-Admiral Lambert served as a midshipman of the *Euryalus* during the Egyptian War, 1882. He was naval assistant to the Second Sea Lord from March, 1911, to July, 1912, when he became commodore in charge of the destroyer flotillas of the First Fleet. He was Fourth Sea Lord from 1913 until he was appointed Director of Personnel, Royal Air Force, on February 13, 1919.

## French Air Minister Flies to England

M. FLANDIN, French Under-Secretary for Aviation, flew from Paris to London on May 13 to confer with the Air Ministry. He came on a Farman Goliath, which left Paris at 11.25, arriving at Croydon at 7.15 p.m. There were 10 passengers on board. He returned to Paris, on Sunday, as a passenger on a Breguet.

## ROYAL AERONAUTICAL SOCIETY NOTICES



**Lectures.**—The next meeting will take place on May 26, at 8 p.m., at the Royal Society of Arts, John Street, Adelphi, when Sir Richard Glazebrook, Zaharoff Professor of Aeronautics, will read a paper on "Some Points of Importance in the work of the Advisory Committee for Aeronautics."

Applications may now be sent in for reserved seats for Com. Hunsaker's Wilbur Wright Lecture on "Naval Architecture in Aeronautics" at the Central Hall, Westminster, on June 22, when H.R.H. Prince Albert will preside.

**Committees.**—A Meeting of the Finance Committee was held on May 12, when the quarterly statement of accounts was presented. The following were present:—Brig.-Gen. Bagnall Wild (Chairman), Maj.-Gen. Sir R. M. Ruck, Mr. A. Ogilvie, and Mr. A. E. Turner (Honorary Treasurer).

The first meeting of the Examinations Committee took place on May 13, when the following were present:—Wing-Com. Cave-Browne-Cave, in the Chair, Messrs. Piercy, Pippard and Pritchard, and Dr. Walmsley. A scheme covering the general principles was drawn up for submission to Council.

**Cambridge University Aeronautical Society.**—A letter has been received from the Secretary of the Cambridge University Aeronautical Society inviting members of the Royal Aeronautical Society, to which it is affiliated, to attend any meetings of the Cambridge body they may desire.

**Library.**—A set of British Standard Aircraft Material Specifications has been received from the British Engineering Standards Association, and placed in the Library for the use of Members. New specifications will be added as issued.

W. LOCKWOOD MARSH,  
Secretary



## THE INSTITUTE OF AERONAUTICAL ENGINEERS



**Council Meeting.**—A meeting of the Council was held on May 3.

**Vice-President.**—Sir Charles Bright, F.R.S.E., has accepted the Council's invitation to become the first Vice-President of the Institute.

**Elections.**—Honorary Diploma:—Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P. Members:—Maj. H. R. Coningsby, A.M.I.A.E., C. W. Tinson, A.F.R.Ae.S. Associate Member:—H. S. F. R. O'Brien. Associate:—Lieut. S. H. Evans.

**Change of Address.**—Since Monday, May 10, the address of the Institute has been 60, Chancery Lane, London, W.C.2 (near the Holborn end of Chancery Lane). Great difficulty has been experienced in finding accommodation, and the new office is not to be regarded as the permanent home of the Institute, and it is hoped

very soon to have permanent headquarters that will meet fully the requirements of members resident in and visiting London.

**Donation.**—The Council desire to express their thanks to Mr. S. T. G. Andrews for the gift of a copy of the work, "Aeroplane Design," by Andrews and Benson.

**Entrance Fees.**—The Council has ruled that on transferring to a higher grade, a Pilot, Associate, or Student shall pay the difference between the entrance fees to his former grade and the higher grade.

**Provincial Branches.**—The Council is prepared to consider proposals emanating from provincial members desirous of developing local branches of the Institute.

**Donations Received for Mrs. Lyne.**—Further subscriptions have been received, and the total is now £15 6s. 6d.

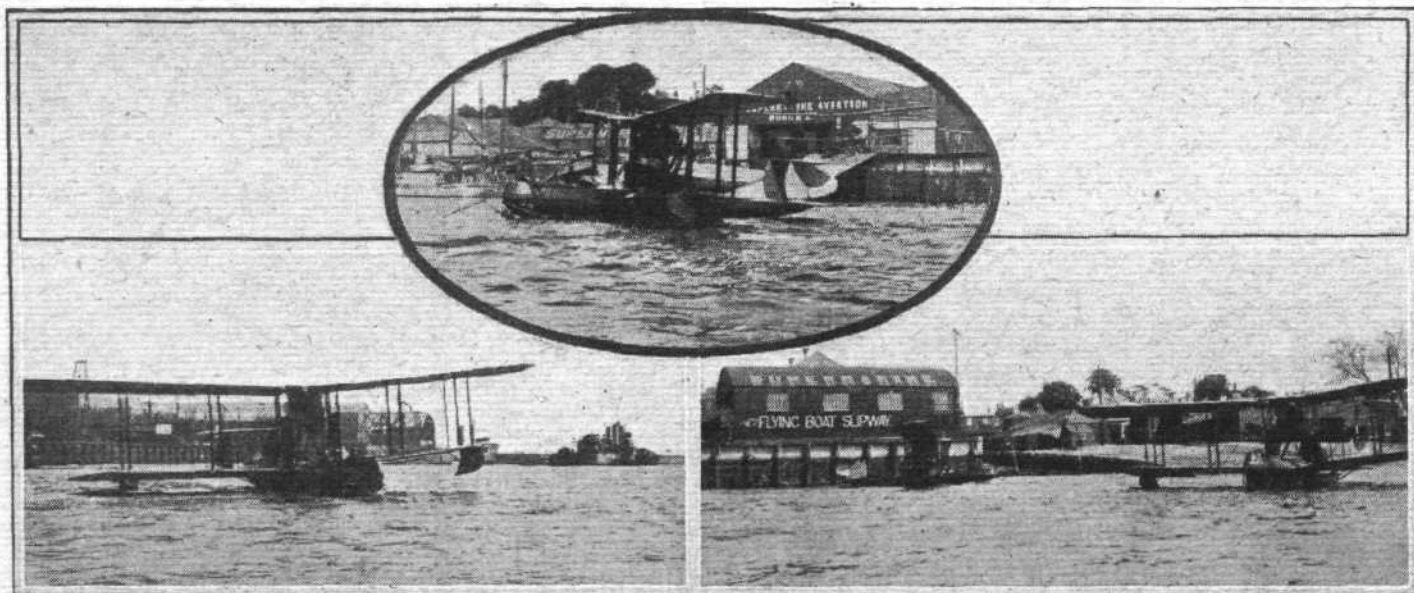
DOUGLAS SHAW, Secretary.



### R.N. Anti-Aircraft Corps Masons

At Freemasons' Hall, W.C., on May 4, Mr. P. Colville Smith, Grand Scribe, consecrated the Royal Naval Anti-Aircraft Chapter, No. 3790, which will be limited in membership to members of the now disbanded corps of that name,

their sons and grandsons. At the conclusion of the consecration ceremony Messrs. Percy C. Webb, G. Wood Wollaston (Richmond Herald) and Robin P. Hamp were installed as the primus Principals. There were 19 founders of the Chapter.



**SUPERMARINES FOR NORWAY:** Our photographs show two of the batch of Supermarine flying boats ordered by the Royal Norwegian Navy. The machine on the left is fitted as a three-seater with special dual control, and will be used as a school machine at the Norwegian naval seaplane base at Horten. The machine shown on the right is of the standard four-seater Channel type, which has proved so successful. Fitted with a Beardmore engine of 160 h.p. only, this machine gets off and alights well with four up, which is no mean performance. The inset shows one of the machines moored to a buoy after completing its trial flights. It is interesting to know that when a complete squadron of these boats has been delivered, they will be used on behalf of the Norwegian Government in conjunction with a private civil aviation enterprise to carry out passenger and mail service between Christiania and Christiansand. A number of officers of the Norwegian Naval Air Service have been given a course of instruction on the Supermarine flying boats. They are all experienced seaplane pilots, and are now fully qualified flying boat pilots



# AIRISMS

## FROM THE FOUR WINDS

THE Aero Exhibition at Olympia, to be held from July 9 to 20, will have the patronage of the Secretary and Under-Secretary of State for Air and the Air Council.

KING ALBERT and his Queen are not only King and Queen of Belgium, they are also King and Queen of Flying. It has become quite a habit of both to make their extended journeys by air, and probably no finer encouragement to progress could be conceived than this every-day custom of taking the air for travelling. We hope their Majesties will presently have many opportunities of making good use of their Bristol fighter, which they have accepted from the H.P. and Aircraft Disposal Companies.

MR. BONAR LAW has again emphasised the policy of the Government as being to economise troops by expanding the use of the Air Service. It is in Mesopotamia where this Arm will have the most outstanding opportunity to make good in the immediate future.

ACCORDING to Admiral von Scheer, the Commander-in-Chief of the German Fleet at the Jutland scrap, in his memoirs, "Germany's High Seas Fleet in the World War," Germany lost 57 of her 61 airships and over 50 per cent. of her U-boats; to be exact, 184 of the latter were accounted for by the Allies.

A MORE modern item of "news" is the semi-official German statement that the German Military Air Service has been disbanded, and the Army now no longer possesses any military aeroplanes. Perhaps! But what does it matter anyway if she has, as her craft would all be more or less obsolete within the next few months. Moreover, by thus clearing the decks, there will be all the more inducement to start and re-build on the most advanced designs.

By way of a moral to the above, it is a little significant that the German Commander-in-Chief is reported to have said, when disbanding the Air Service on the 8th inst., "We do not give up hope that our flying squadrons may yet come to life again."

JULY 10! Lest our authorities forget.

TAKING advantage of the new afternoon 4.30 Air Service from London to Paris, the *Evening News* publishers have been sending over consignments of their 6.30 edition, which it has been possible to obtain at the Paris kiosks by about the time this enterprising journal fixes its publication hour, which must discount "tomorrow's" papers just a few when they reach the French capital a day or so later!

QUITE a fillip may be given to Stock Exchange arbitrage business by its conduct from the air, in co-operation with the improved aerial telephones which are being fitted to the H.P. Cricklewood-Paris 'buses. These instruments, it is stated, are quite capable of transmitting a verbal message a distance of 300 miles, and their perfection opens up such possibilities. There is one little nigger, however, in using them. At present the law only allows the aerial telephone to be used under the direction of the Central Control Board for the purposes of assisting navigation and flight. No message may be picked up by a private station, nor is transmission by arrangement allowed. Business-men already enjoy facilities for conducting their affairs while travelling in trains or ships, and it is hoped that the regulations will presently be made elastic enough to include air travel.

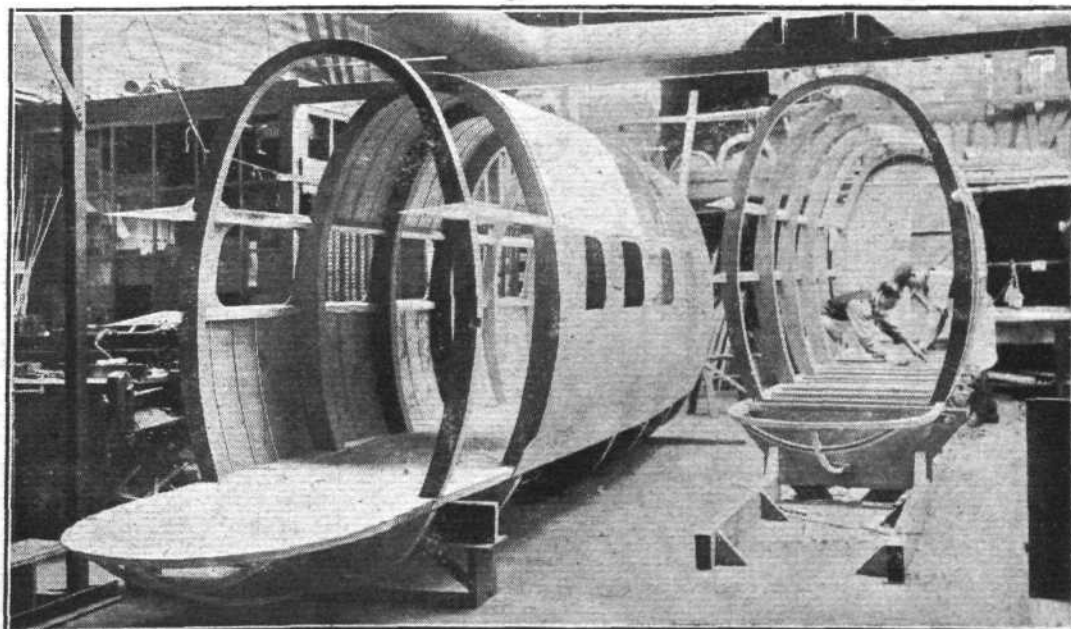
"When that is done," says an H.P. official, "the business hustler will be able to make use of the aerial 'phone and direct his operations from the air during a London-Paris flight."

Arbitrage is pretty smart work anyhow under ordinary conditions. With the above hustling possibilities and the difference in exchange gamble, there should indeed be plenty of scope for lightning transactions by some of the wily ones.

MANY of our readers are acquainted with the name of Capt. C. T. Tyrer—one of the familiar figures and hard workers at Hendon in the good old pioneer days—and will, no doubt, be interested to learn of his latest doings. During a brief and hasty visit to the offices of *FLIGHT* the other day, Capt. Tyrer (with monocle!) informed us that he is leaving immediately with the "Holmes-Richardson" Expedition through the less-known parts of Central Africa (the Pigmy Country, etc.). The main object of the expedition is, we believe, to obtain film records of the various inhabitants—human and otherwise—of this most interesting part of the world. Incidentally, also, Capt. Tyrer said he was hoping to obtain some useful data in connection with aviation and flying routes through Central Africa. This will be by no means his first visit to these parts, for he was with the "Jules Verne" Expedition to Tanganyika with the now famous motor boats.

JUDGING from the one or two stories Capt. Tyrer told us of his experiences during the time he was Raid Officer for the Night Bombing Squadron in France (towards the latter part of the War), he has some very interesting, exciting and amusing material at his disposal, and we look forward to the time when he is able to relate his experiences in full. Here's the best of luck to Captain Tyrer throughout the expedition, and a safe return.

"Vickers-Vimys" for China: Erecting the cabins: A large batch of Vickers - Vimy - Commercial are now being completed at Weybridge for the Chinese Government. Our photograph gives a good idea of the absence of cross bracing inside the cabins of these machines





It may be that on the occasion of the journey of H.M. Airship 33 over Holland some months ago the passengers had the unique experience of receiving at breakfast-time a newspaper which had been written, from information supplied to the airship by wireless, and actually produced on board. This aerial edition of *The Times* was the first of its kind, and will always remain a remarkable example of enterprise. Sir Charles Wakefield, who has one of these copies, has recently become possessed of a rare little publication which is an early attempt to indicate the possibilities of such a production, and it forms an amusing contrast. It is a small four-page leaflet bearing the title, "The Aerial Messenger," and is dated June 13, 1839. Beneath the date is the quaint inscription, "Printed at the Aerial Press, in the Isle of Sky, about a mile high from Cremorne House, Chelsea; and Published at the same place, by Poppolino Pica, Typo. in chief to the Aerial Messenger."

It is evident that this little journal, which thus professes to be the first one printed in mid-air, was produced as an advertisement for Mr. John Hampton, an aeronaut who was making balloon ascents at that time, for an announcement appears in which he gives his address as 6, Hanover Place, Regent's Park, an address which no longer exists according to the modern London atlas. Having referred to various ascents he has made in his splendid Albion balloon, Mr. Hampton "begs to inform his friends and the public that after he has performed his Parachute Descent he is about to materially alter and enlarge the Aerial Machine, rendering it not only of greater dimensions, considerably increasing its ascending power, but improving very essentially its shape, and which, in its enlarged form, with the Ornamental Embellishments, executed by Artists of first-rate ability, under his own superintendence, the gorgeous and highly Emblazoned Car, and the appurtenances throughout, it will be unquestionably the most magnificent Balloon ever yet exhibited.

"Mr. Hampton will be happy to engage with the Proprietors of Public Gardens, the Conductors of Fêtes, etc., to ascend in any part of the Kingdom on moderate terms.

"Seats in the Car, accommodating six persons, 10 guineas each."

SEATS which accommodate six persons each would compare favourably with the average seat in a modern "Aerial Machine"—but perhaps grammar is not one of the strong points of the Aeronaut!

THERE is, of course, a leading article, without which no newspaper was ever complete, and it has for a heading the following lines:—



#### To Our Readers

As we continually receive complaints from readers that they experience difficulty in obtaining their copy of *FLIGHT* promptly each week, we draw their attention to the subscription form which is printed on page xxii of the current

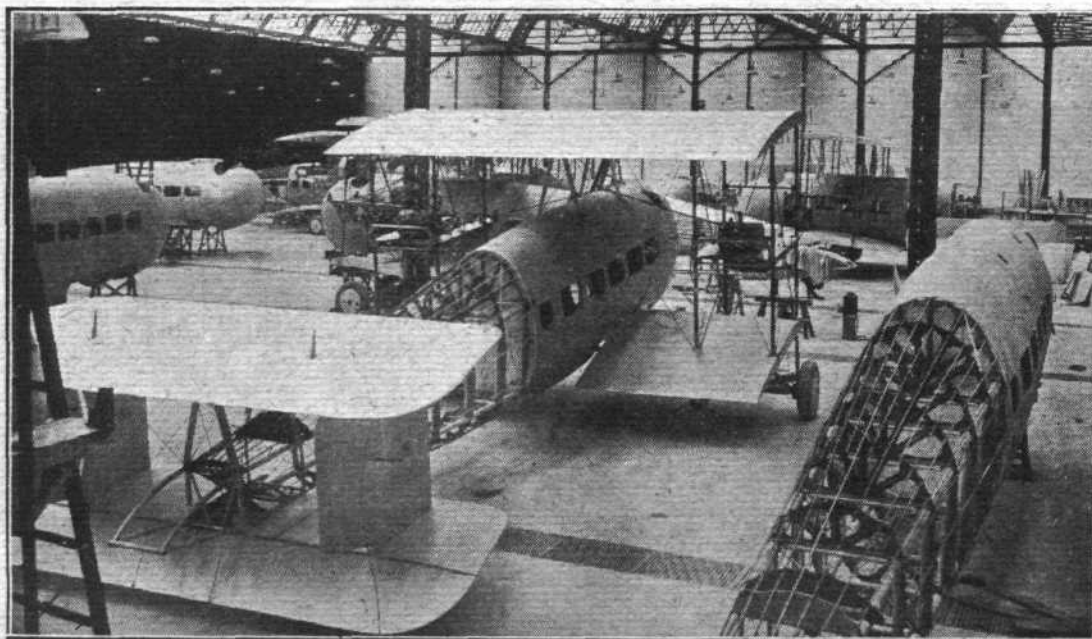
"All mankind to some loved ills incline,  
Men choose great sins,—  
Ascending's mine!"  
(Shakespeare improved.)

THE Editor explains that Aerial Editors write in the plural as well as earthly scribes, and proceeds to assert that he is not concerned with party politics, proclaiming his independence of Conservatives, Chartists and Whigs alike. (How strange these names sound in 1920!) His literary style may be seen from the following extract from the leading article:—

"If any of our readers consider that we turn our backs to them in consequence of our 'high notions' they must frankly admit that we are wholly divested of pride or stiffness, for we freely *look down* with a respectful eye upon the meanest even of creation. And then again, who can deny our high-minded greatness when they witness the immense numbers of persons who are even now *looking up to us*? What is the patronage of Royalty compared with ours? When it must be fairly admitted that we are at this very moment *above Royalty itself*! What is Lord Melbourne's peerage and Premiership to ours? Comparatively insignificant, for we are far more elevated in both. If we choose to 'wheel about and jump Jim Crow' in that elevated station we hold in life, where is the opposition that could conveniently *turn us out*? And how few, though much as they may admire, would exchange with our lofty situation? We are therefore pretty certain of not relinquishing our *places*! Well here we are, pursuing the even tenor of our way, with all the calmness imaginable, our Aerial Car floating through regions of boundless space, impeded not by saucy turnpike toll collectors or worried from pillar to post by troublesome omnibus drivers. We care for nothing, nor do we dread an awful collision with other travelling vehicles of our own caste,—but, kind readers, we must halt, for although there are no inns up aloft, to stop and bait at, our *leader* is getting lame, so we for the present check its progress, and say, *adieu*."

THIS extract may give food for thought to some of the enterprising companies now organising aviation exhibitions in the coming season. By the way, the high standard of the aeronautical press was already established in those early days, for an advertisement of a book entitled "The Aeronautical Annual, or Hampton's Balloon Bulletins during the Season 1838," concludes with the announcement, "To be had of all Respectable Booksellers"! Presumably there were others.

issue. If this is sent, accompanied by the appropriate remittance, to the publishing offices, 36, Great Queen Street, Kingsway, W.C. 2, it will ensure *FLIGHT* being received promptly and regularly each week upon the day of publication.



"Vickers-Vimys"  
for China: A  
batch of Vickers-  
Vimy - Commer-  
cial machines in  
various stages of  
erecting at the  
Weybridge works  
of Messrs. Vickers,  
Ltd.



## BORN 1916—STILL GOING STRONG

ONE of the many allegations made against aircraft is that their life is very short, a year of flying being often put as the limit of the useful life of an aeroplane. A good instance of the fallacy of this argument is furnished by the famous L. and P. biplane, designed for that firm by Mr. A. A. Fletcher, who is now chief designer to the Central Aircraft Co., and built in 1916. The machine was fully described in *FLIGHT* of July 27, 1916. The accompanying photograph shows the machine as she looks today after having been thoroughly overhauled and fitted with a 100 h.p. Anzani engine instead of the 60 h.p. Anzani originally fitted. This

of all she did, but out of the many a few may be mentioned. It would probably give aerodynamic experts furiously to think when it is stated that this machine has flown with a set of S.E. 5 wings strapped to the under side of her bottom plane, without this appearing to interfere with her flying to any appreciable extent. It does not seem unlikely that, although the original purpose of these tests was to find out whether or not it was possible to carry wings in this manner, the aerodynamical proof of the feasibility of this may be put to some other purpose in designs of the future commercial aeroplane.



**A FRISKY FOUR-YEAR-OLD :** Our photograph shows the famous L. and P. looper on which Mr. Smiles set up a series of looping records at Hendon in 1916. The machine has been overhauled, and is now as good as ever

machine, which is now advertised for sale (see Adv. pages), has had a most interesting career, and the fact that she is still in first-class condition speaks volumes for the soundness of the design and for the quality of the workmanship put into her by the original builders. While owned by the London and Provincial Co. the machine did a tremendous amount of stunt flying in the hands of such pilots as Smiles, Warren and others. She has made goodness only knows how many loops, not to mention other stunts.

During the War the machine was used for experimental purposes, the uses to which she was put being many and varied. There is no space here to give a detailed account

Later on this machine was used for experimenting with parachute descents, of which a great many were made by the experts of Messrs. Calthrop's Aerial Patents, and it is probable that there is not another machine in existence in England today from which so many parachute jumps have been made. One might go on recounting the experiments carried out with this machine, but sufficient has been indicated to show that hers has been no life of leisure. Yet here she is, as good as ever, ready to show that, given reasonable care, a machine will last for years, even when being used for experimental work of a varied and strenuous nature.

## THE LONDON-AMSTERDAM AIR SERVICE

ON Monday last the first regular Air Service between this country and Holland started, when two Airco machines left Croydon for Amsterdam. Machines will leave London on Mondays, Wednesdays and Fridays, and return on Tuesdays, Thursdays and Saturdays. The aerodrome in Holland is 20 minutes by car from Amsterdam.

From this side the following time-table is to be worked to:—London (Croydon), dep., 10 a.m.; Amsterdam, arr. 12.45 p.m. Train connections permit of arrival at The Hague at 3.5 p.m., and at Rotterdam at 3.21 p.m.

The journey is one of considerable interest, as the route followed is Folkestone, Calais, Dunkirk, Nieuport, Ostend, Zeebrugge, The Hague, Amsterdam, and passengers get a wonderful survey of the Belgian battlefields between Dunkirk and Ostend, the complete devastation of the country and the terrible effect of heavy gunfire being brought out vividly.

North of Ostend batteries of heavy German guns in their emplacements can be clearly seen pointing to the sea, and a view is obtained of the *Vindictive* lying across the canal mouth of Zeebrugge.

The machines used are of the same type as those operating the two services daily between London and Paris, the famous Airco 16 four-passenger limousine aeroplanes.

Special arrangements have been made for the rapid conveyance of goods, and all parcels leaving in the 10 a.m. machine consigned to Amsterdam, Rotterdam or The Hague, will be delivered during the same day. Parcels for this service should be handed in to the usual booking agents, or to Aircraft and Travel, Ltd., 27, Pall Mall; Telephone: Regent 930.

The charge per passenger is 15 guineas single, and 2s. 6d. per lb. for small consignments of goods down to 1s. 6d. per lb. for larger loads.

### The Olympia Show

THE Secretary and Under-Secretary of State for Air and the Air Council have consented to become patrons to the Aero Exhibition, which will be held at Olympia from July 9 to July 20.

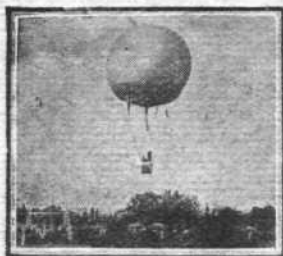
### The "Daily Express" £10,000 Indian Flight

It had been intended that the Handley Page-Napier, piloted by Major A. Stuart Maclaren, should have started from Croydon on Saturday for India, but, as stated in the Royal Aero Club Notes on p. 549, owing to the unsettled state of affairs in Arabia, the Air Ministry put a ban on flying east of Cairo. Two entrants now await official permis-

sion to start, Major Maclaren on the Handley Page-Napier, Old Carthusian II, who will have Capt. J. A. Barton with him as navigator, and Mr. R. W. Kenworthy on the Blackburn Kangaroo-Rolls-Royce, who will have Capt. G. H. Wilkins as navigator.

### The Air League of the British Empire

At a meeting of the Executive Committee of the Air League of the British Empire it was decided that a Mansion House Meeting should be arranged for June 8, at 12 noon, when the Lord Mayor will take the Chair. It is hoped that many prominent members of the Stock Exchange and of the Baltic will be present.



# AIRSHIPS



## RIGID AIRSHIPS AND THEIR DEVELOPMENT

BY J. E. M. PRITCHARD, M.A., F.G.S.

(Continued from page 528.)

### Keel.

THE keel of a rigid has passed through several stages. As originally designed, it formed a kind of backbone to give strength to the hull. It was triangular in cross-section, and fitted outside the ship, hence the term "keel." This arrangement was soon found to be uneconomical. It increased the head resistance unnecessarily, and made the ship less manoeuvrable, and it was further found that the hull could be built equally strong and with less weight if the keel were done away with and the hull made uniformly stronger.

The keel was then almost entirely done away with, and a small internal keel or corridor was fitted inside the ship having little structural strength. This was found perfectly satisfactory from the point of view of the general strength of the hull, but in modern ships, with their high percentage of disposable lift, did not allow sufficient accommodation for petrol, water ballast and crew.

The keel as at present constructed is internal, and of sufficient strength to carry the disposable weights. It should be regarded as a kind of weight distributor to which the various petrol tanks, water ballast bags, etc., are attached. Theoretically, with the present type of rigid, it would be more economical in weight if all fuel and water ballast were actually suspended from the various main transverse frames, but in modern high-efficiency rigids the actual bulk of water and petrol carried prevents this being done, and a certain amount has to be distributed between the various frames. It is, therefore, necessary to construct a keel in the form of a continuous girder of sufficient strength to support these weights.

Careful attention must be paid to the distribution of the various dischargeable weights fitted in the keel, and to their position as regards the centre of lift.

To a minor extent this is also necessary with certain of the non-dischargeable weights. For example, the sleeping quarters and the crew space should be so arranged that their centres of gravity are coincident, so that when the men leave

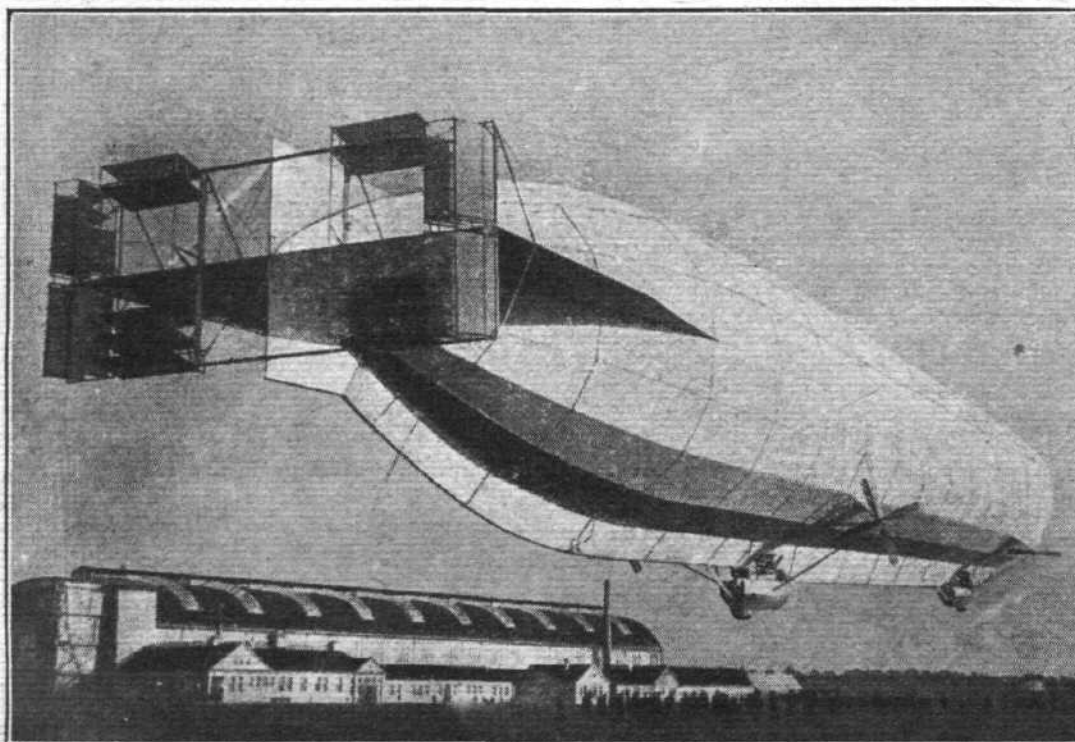
their sleeping quarters and proceed to the crew space for food prior to going on duty, the trim of the ship should remain unchanged. The crew space should also be so arranged that its centre of gravity is roughly coincident with the watch on duty, so that the crew never change the trim of the ship. At the same time, in arranging the sleeping quarters, it is most desirable to choose positions as far away as possible from the power units, where the noise is excessive.

In the case of the dischargeable weights, the emergency (landing) water ballast should be fitted as near each end of the keel as possible, and should approximately balance about the centre of lift, so that the discharge of an emergency bag forward would give an up-angle corresponding in magnitude to the down-angle produced if an emergency bag aft had been discharged. The petrol should also balance about the centre of lift, so that the ship is equally in trim when completely filled with petrol ready for a long flight or when spent at the end of a long flight, or after rising to a great height. The normal water ballast should also be arranged to balance about the centre of lift. If, through some error in design, the ship is out of trim when spent, it should be noted that the amount of dischargeable weight necessary to correct this error in trim is to all intents and purposes dead weight, as it is impossible to use it without putting the ship out of trim.

### Fins.

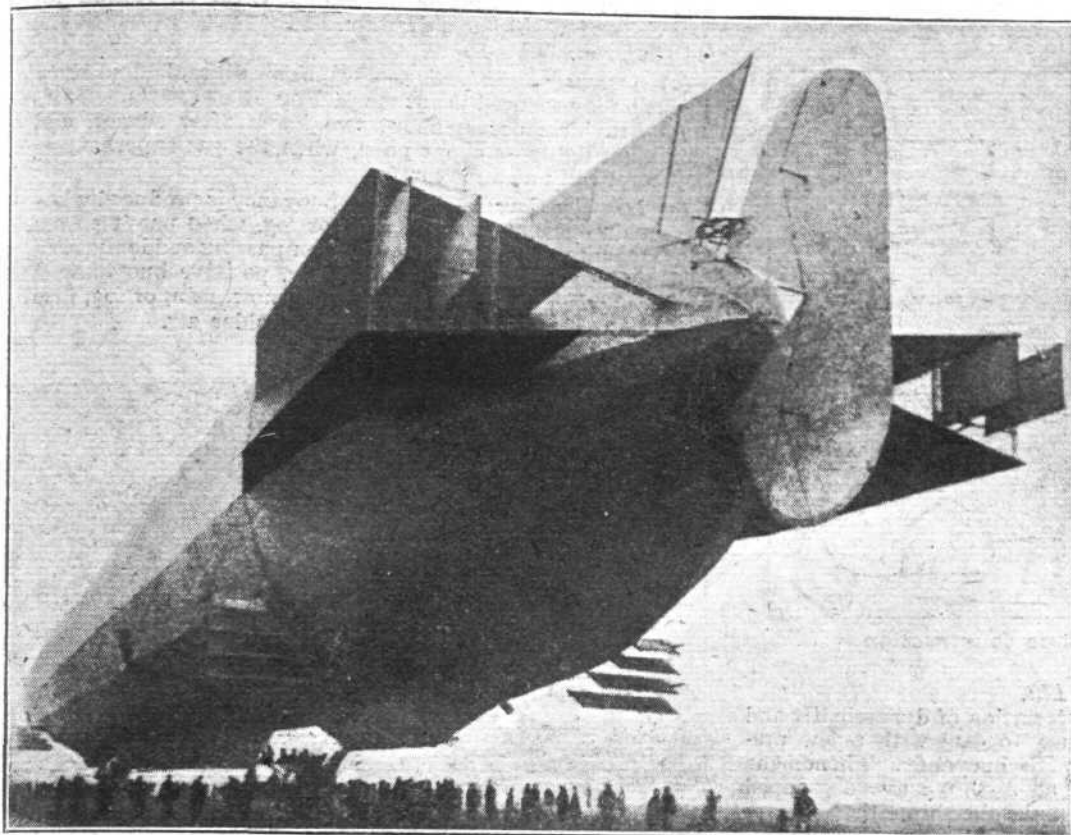
One of the most noticeable features of rigid construction in recent years is the reduction in fin area.

The result to be aimed at is not to make the ship too stable, as was first considered desirable, otherwise, when she encounters disturbed air conditions and is thrown off her course either vertically or horizontally, it takes, owing to her over-stability, too long to bring her back again. This effect is more marked in the vertical plane, and it is much more difficult to maintain an over-stable ship flying at a constant height in disturbed conditions than one with less fin area. The point to be aimed at is to make the ship just stable enough



Fin and plane construction. Pre-War (German) Z 11





Fin and plane  
construction.  
Pre - War (Ger-  
man) Z 111

so that it does not too rapidly swing off its course, but can, at the same time, have its direction changed or corrected rapidly by the use of the movable planes.

Although the 33 class is of twice the capacity of the 23 class, the turning circle of the former is only about half as great as the latter, and in disturbed weather conditions the 33 class is by far the more controllable.

The old type of parallel-sided fin stayed to the ship by a large number of wires is gradually giving place to the new triangular streamline type fin. This type of fin does not appear to give quite the stabilising effect per unit area as the older type, but has the following important advantages which more than counter-balance its slightly lower efficiency. The triangular fin is for most of its length self-supporting. A great saving in head resistance is also achieved by the omission of all bracing wires except in way of the pintle bearings which, in both types, have naturally to be stayed. As far as weight is concerned, the triangular fins appear to have little advantage over the older type. The general cantilever arrangement, however, which enables the load to be distributed between three longitudinals instead of one as in the old scheme, is of

great advantage, and further, by reducing the number of wires, the compression in the vertical members of the fin is considerably reduced.

The general arrangement of this type of triangular fin is seen in the illustration.

#### Planes.

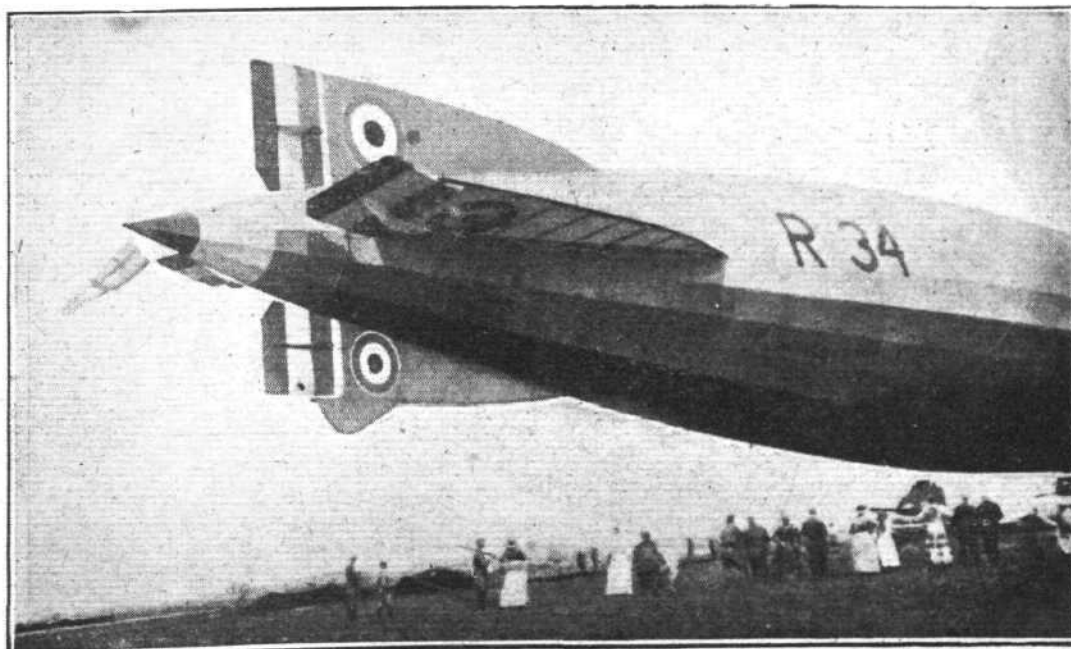
In the movable planes, just as in the fixed fins, considerable progress has been made.

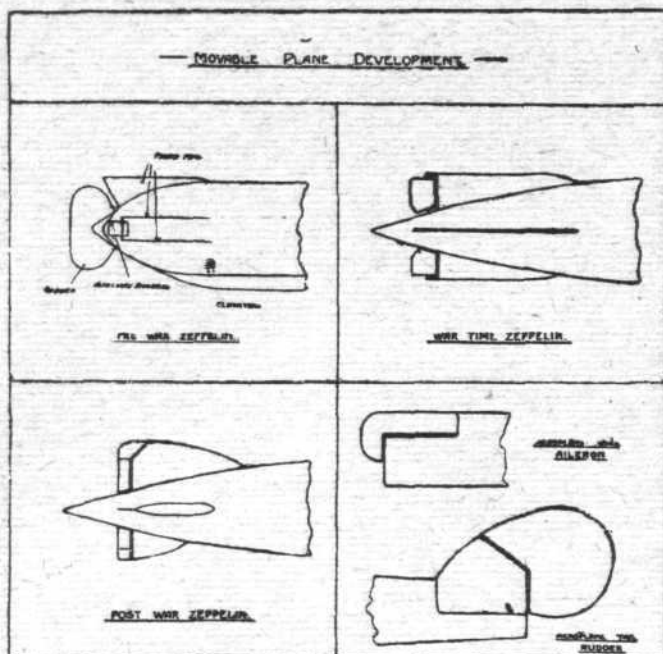
The photo. on this page and that on p. 554 show the large number of small movable planes fitted to early rigids.

The next step in the development of movable planes was introduced by the Germans in their Schütte Lanz ships, and later copied by the Zeppelin company, and has, up to last year, been considered the best arrangement.

Recent experiments, however, have tended to show that the cruiser type of balanced plane, extensively used in aeroplane construction, is more efficient. The drawing (p. 556) shows the development of airship planes from the early pre-War Zeppelin to the present "Bodensee," and indicates the similarity between the plane construction for this ship and for modern aeroplanes.

R 34 fin and plane  
construction





Development in plane construction

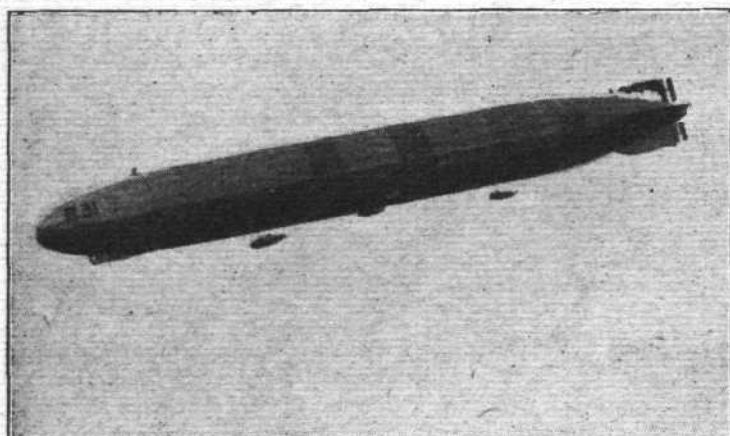
*Dynamic Lift.*

In order to obtain a clear appreciation of dynamic lift and its allied problems, it is necessary to deal with a few preliminary questions connected with buoyancy. Phenomena which change the buoyancy of an airship may be grouped under three heads, and tend to make the ship either heavier or lighter than the surrounding air.

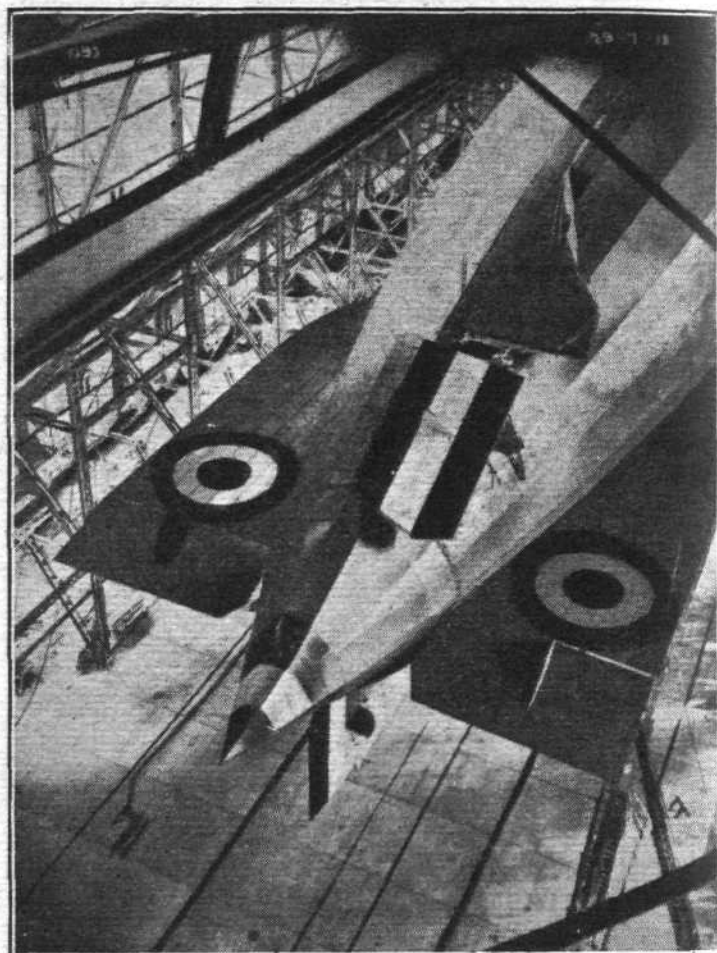
(1) *Fuel Consumption.*—This tends to produce positive buoyancy, and is capable of mathematical expression for any class of airship as a function of the speed at which the ship is flown.

(2) *Gaseous Superheating.*—By this diurnal buoyancy variation is produced if not masked by other effects. Maximum heaviness occurs about two hours after sunset, and maximum lightness about noon, when the gas superheating is theoretically at a maximum.

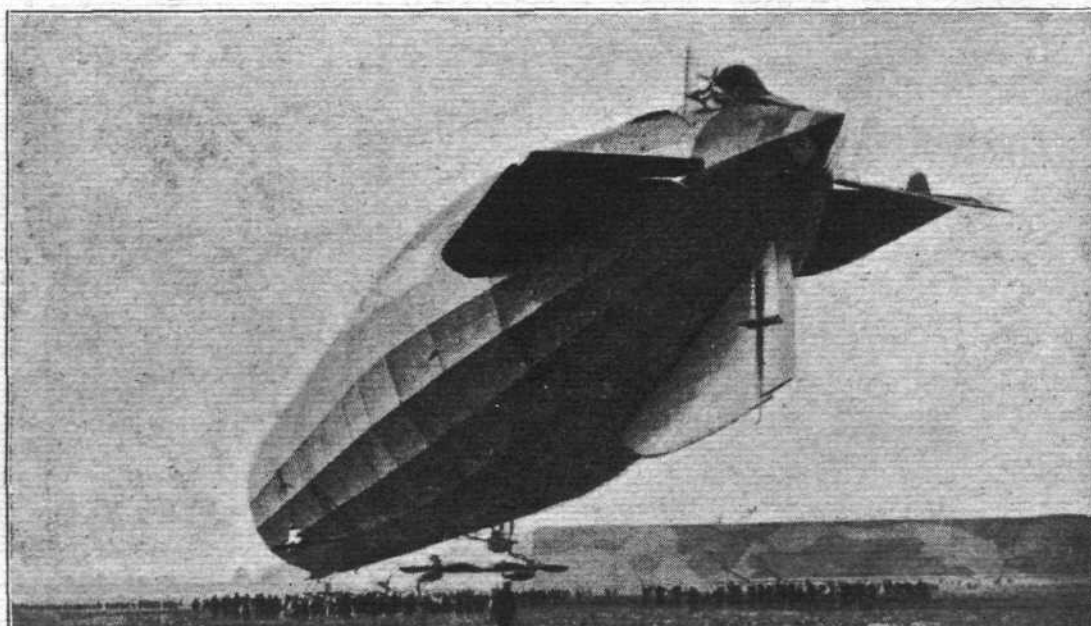
(3) *Irregular Causes.*—Negative buoyancy is produced when an airship encounters snow, rain, or fog, when passing from sunshine into or under cloud, or when passing suddenly from cold air into warmer air. Conversely, positive buoyancy is produced when an airship passes from snow, rain, or fog, into sunshine, or when entering suddenly colder air.



R 31 in flight showing initial stages in collapse of the top vertical fin. First stage



R 31 in shed, showing collapsed top fin. Third stage



R 31 on landing-ground, showing collapsed fin. Second stage



It will, therefore, be seen that an airship is seldom in equilibrium with the surrounding air. To maintain a horizontal path, the airship must fly at an angle up by the bow if heavy, down by the bow if light. This inclination of the axis of the ship in the vertical plane is caused at will by actuating the horizontal plane surfaces, which, according to their inclination, tend to depress or raise the stern. If the ship is in equilibrium it tends to rise or fall at a rate  $A \sin \theta$ , where

$A$  = the air speed.

$\theta$  = the angle of inclination of the axis of the hull to the horizontal.

If, however, the ship is light or heavy, the rate of rise or fall is no longer proportional to  $A \sin \theta$ . A point is finally reached where the rate of vertical rise (or fall) due to the positive or negative buoyancy of the ship is equal to  $A \sin \theta$ . The ship then maintains a constant altitude, but flies at a constant inclination  $\theta$  to the horizontal.  $A \sin \theta$  can be increased by increasing either the angle of inclination or the speed. In practice, an angle  $\theta$  of more than 8 deg. is most undesirable, primarily because of the amount it slows down the speed due to the increased head resistance of forcing the streamlined hull unsymmetrically through the air.

The increase in size of ship also has an important bearing on dynamic lift.  $A \sin \theta$  is independent of the size of ship, but the vertical rate of rise or fall due to a given percentage of positive or negative buoyancy is dependent on the surface area of the ship, and, therefore, varies approximately as the (linear dimensions).<sup>2</sup> Hence, ships of similar form but of dissimilar size, flying at a constant speed and at the same percentage heavy or light, in order to fly at a constant altitude will have to take up an angle approximately proportional to the (linear dimensions).<sup>3</sup> In other words, under normal conditions, the low speed of the ship "A" will have to be increased with size to raise the value of  $A \sin \theta$  proportionally to the (linear dimensions).<sup>3</sup>

When flying light or heavy an interesting phenomenon occurs, which is especially noticeable in modern streamline rigids fitted with small stabilising surfaces aft. As evening approaches and the superheating diminishes, the ship appears to become tail heavy at the same time as she becomes heavy, and, conversely, in the morning, as the gas superheats and the ship becomes light, she appears to become at the same time nose heavy, so that in extreme cases of lightness the ship is flown with a constant down angle to maintain a constant

altitude, but with the elevators hard up. If the ship becomes still lighter, she gradually begins to lose height, and only rises when speed is reduced. The converse effect is experienced when the ship is heavy.

The explanation of this phenomenon appears to be that when a streamline form like R 33 is pushed unsymmetrically through the air, due to two forces acting on the ship at approximately right angles (namely, the force due to the thrust of the propellers acting parallel to the axis of the hull, and the vertical force due to the positive or negative buoyancy acting upwards or downwards, as the case may be), the airship tends to become unstable, the upsetting couple varying for small angles directly as the angle of pitch for any given speed. Naturally, the larger the stabilising surfaces the less marked will be this effect, and in practice it will be this form of eccentric instability which will determine the size of the horizontal fins and planes, as the stabilising area required for correcting this tendency is appreciably greater than is required to secure the necessary degree of vertical controllability when flying in equilibrium through disturbed air. The amount of this couple is given by the formula:—

$$M = KV^2 p \theta$$

where  $M$  = pitching moment.

$K$  = a constant depending on the size and shape of the ship, including the area of its horizontal stabilising surfaces.

$V$  = air speed of ship.

$p$  = density of atmosphere.

$\theta$  = angle of pitch.

This dynamic effect can be minimised by altering the static trim of the ship; thus, when the ship is light and becomes dynamically nose heavy, petrol can be pumped aft to alter the static trim, and, conversely, when the ship is heavy petrol can be pumped forward. This method of static trimming to correct dynamic trim must, however, be carried out with extreme caution, as after such trimming the ship is in reality either statically heavy and at the same time trimmed down by the bow, or statically light and at the same time trimmed up by the bow. This means that if, for any reason, the ship should be slowed down, she will if heavy dive rapidly and possibly crash into the sea, or if light rise rapidly, and, if flying with the gasbags nearly full, will inevitably rise well above her equilibrium height and become very heavy.

(To be Continued.)

## AVIATION IN PARLIAMENT

### R.A.F. Officers' Titles

MR. C. PALMER, in the House of Commons on May 11, asked whether a naval officer who was lent to the Air Service in which he attained the rank of lieutenant-colonel is entitled to retain that rank and to use the designation of lieutenant-colonel after being dismissed His Majesty's service?

MR. CHURCHILL: A naval officer who has been gazetted as relinquishing his temporary commission as lieutenant-colonel in the Royal Air Force and who has subsequently been dismissed the Naval Service, or whose name has been removed from the Navy List, has no right to use the designation of his former rank in the Royal Air Force without a specific application to the Air Council through the Admiralty. I may add that in such a case it is most improbable that the Air Council would accede to the application.

MR. PALMER: Will the right hon. gentleman take immediate steps to see that the military rank shall not be improperly assumed for anti-British purposes?

LIEUT.-COM. KENWORTHY: When these naval officers are transferred to the Air Service, is it for four years and four years in the Reserve?

MR. PALMER: Does not the fact that a member of His Majesty's service

has been dismissed necessarily mean that he reverts to the position of a civilian, and has no right to any military rank whatever?

MR. CHURCHILL: I have put questions to the authorities on the subject, and I think it must be dealt with on its merits.

### The Irish Channel Flight

LIEUT.-COL. CROFT, on May 13, asked the Secretary of State for War and Air whether certain officers were ordered to fly Bristol aeroplanes across the Irish Channel on February 21; whether the petrol-supply of the aeroplanes sent on this flight allowed of practically no margin for any contingency arising from mechanical trouble or weather conditions or deviation from the prescribed course; and what steps he has taken to cause an enquiry into this matter?

MR. CHURCHILL: The reply to the first part of this question is in the affirmative. With regard to the second part of the question, I must refer to the reply which I gave to the hon. and gallant member for Leith (Capt. W. Benn) on April 23. It is quite incorrect to say that there was practically no margin for any contingency. With regard to the last part of the question, a Court of Enquiry has been held.



### H.P. Continental Services

THE record of the Handley Page Continental Air Services (in conjunction with Cie. Messageries Aériennes) from September 2, 1919 to May 8, 1920, was as follows:— Passengers carried, 1,350; freight carried, 75,284 lbs.; mileage covered, 99,017 miles.

### A North Wales Aerodrome

A NEW aerodrome is being opened for Whitsun and the coming season at "Morfa Conway," North Wales, which will enable visitors to Llandudno, Conway, Colwyn Bay, Bangor, etc., to obtain joy-rides and aerial tours. The aerodrome and flying will be under the management of Mr. R. G. Carr, ex R.F.C. and R.A.F., who during the War made a wonderful escape from Germany, when a prisoner of war.

Special attention has been paid to the comfort of the general public, and teas and light refreshments will be served on the aerodrome. Motor-buses will be run between the aerodrome and the large towns in the district.

The equipment includes 80 h.p. Renault-Avro machines, and it is hoped to have six of them running by the end of June.

### Low Parachute Diving

REPRESENTATIVES of the Governments of Norway, Sweden, Chile and Argentina witnessed demonstrations by Major Orde Lees with the Guardian Angel parachute, on May 15 at Cricklewood. One test included jumping head first from the machine when at a height of 600 ft.; the parachute opened in 2 seconds and Major Lees alighted quite easily and comfortably.

### No. 2 Squadron, R.A.F.

It is proposed to hold a reunion dinner in the autumn to enable the arrangements to be made; those interested are asked to communicate as soon as possible, with the Hon. Sec., Mr. J. O. Comber, Ashenhurst, Guildford.

### Aeroplanes for Race Work

ENGAGED to race at Brussels, on May 9, the jockeys Slade and Shatwell flew there by the Instone Air Line "Vickers-Vimy." They left Croydon aerodrome in a blinding rain-storm at 8.20 a.m. and arrived in Brussels at 10.40, rode in their race during the afternoon, and returned to town by the same machine the following day. On the next day they flew to Newmarket by another machine of the Instone Air Line.

# THE ROYAL AIR FORCE

London Gazette, May 11

## Permanent Commissions

Sqdn. Ldr. A. Grant, M.B.E., M.B. (Medical), is granted a permanent commn. as Sqdn. Ldr.; March 26.

Air Vice-Marshal Sir G. M. Paine, K.C.B., M.V.O., is placed upon half-pay (Scale A), with effect from April 1. Air Vice-Marshal Sir G. M. Paine, K.C.B., M.V.O., is placed on the retired list at his own request; May 12.

Flying Officer A. H. G. Dunkerley (A.) resigns his permanent commn.; May 12.

## Short Service Commissions

Flying Officer F. Dunlop relinquishes his short service commn. on account of ill-health contracted on active service; May 11.

The following temp. appt. is made:—

Staff Officer, 1st Class—(P.)—Lieut.-Col. (actg. Brig.-Genl.) A. C. H. Maclean, C.B.E., and to relinquish actg. rank of Brig.-Genl.; Mar. 17, 1919. (since relinquished commn.)

## Flying Branch

Sec. Lieuts. to be Lieuts.—(Hon. Lieut.) A. Cox; Sept. 12, 1918. J. A. Stewart; Oct. 26, 1918 (since demobilised). M. G. Ryan; Dec. 29, 1918. R. N. Bell; March 26, 1919 (since demobilised). R. C. S. Hall; May 30, 1919 (since relinquished commn.).

Pilot Officers to be Flying Officers.—G. R. Moffoot, D.F.C.; Aug. 2, 1919 (since relinquished commn.). G. J. Gawthorn, D.S.M. (since demobilised). J. S. Middleton, J. V. Reeve; Oct. 1, 1919. J. E. Goudey; Dec. 27, 1919. Pilot Officer W. W. Bradford (O.) to be Observer Officer; Jan. 5. Lieut. T. L. Settle (Lieut. (Reg. Bn.) S. Staff. R.) relinquishes his temp. R.A.F. commn. on return to Army duty; March 19, 1919. Lieut. N. G. Reynolds (Lieut., E. Ontario R.) relinquishes his temp. R.A.F. commn. on return to Canadian Unit; Jan. 10.

(Then follow the names of 21 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. J. A. Oliver relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; May 5. The surname of Capt. H. L'Estrange Tyndale-Biscoe is as now described, and not as stated in *Gazette* of April 29, 1919. The Christian name of Lieut. John Cross is as now described, and not as stated in *Gazette* of April 13. The notification in *Gazette* of Sept. 19, 1919, concerning S. W. Gee is cancelled.

## Administrative Branch

Maj. E. C. Mulgrue is graded for purposes of pay and allowances as Lieut.-Col. while employed as Lieut.-Col.; May 1, 1919, to Nov. 2, 1919 (since demobilised). Flying Officer G. Oliver is graded for purposes of pay and allowances as Sqdn. Ldr. while employed as Sqdn. Ldr.; Oct. 16, 1919, to Feb. 15. Sec. Lieut. A. F. Johnston to be actg. Lieut. while employed as Lieut. Grade (B); Oct. 30, 1918 (substituted for notification in *Gazette* of May 4. Sec. Lieut. A. A. Mackay to be Lieut.; Feb. 30, 1919 (since demobilised).

Pilot Officers to be Flying Officers.—H. J. Grant; Oct. 1, 1919 (since demobilised). G. H. Keeble; Nov. 1, 1919. (Act. Lieut.) H. Balls; Dec. 1, 1919. G. C. Wilson; Feb. 4. E. J. Cam; March 21. A. Worthington; March 30. Sec. Lieut. H. J. Thomas to be Sec. Lieut. from (T.); May 1, 1919. Lieut. (temp. Capt.) J. H. Jackson (Lieut. Ches. R. (Service Bn.)) relinquishes his temp. R.A.F. commn. on return to Army duty; June 20, 1918.

The following relinquish their temp. R.A.F. commns. on ceasing to be employed:—Lieut. (Hon. Capt.) W. Grischette (Capt., Shrops. L.I.); Jan. 29, 1919. Lieut. (actg. Capt.) H. M. Taylor (Sec. Lieut., S. African Forces); July 13, 1919.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

*Gazette* of Feb. 27 concerning Lieut. H. M. Taylor is cancelled.

## Technical Branch

Flying Officer (actg. Flight Lieut.) E. J. Newman relinquishes the actg. rank of Flight Lieut. on ceasing to be employed as Flight Lieut.; May 6. Sec. Lieut. H. H. E. Wood to be Lieut.; May 26, 1919, without pay and allowances prior to July 1, 1919 (since demobilised) (notification in *Gazette* of Aug. 9, 1918, to stand). Pilot Officer H. Cantrill to be Flying Officer, Grade (A); Oct. 1, 1919 (since demobilised).

Pilot Officers to be Flying Officers, Grade (B).—P. G. Price (since demobilised), W. C. Titheradge (notification in *Gazette* of July 22, 1919, to stand); Oct. 1, 1919. D. C. Manuel; Dec. 10, 1919 (since demobilised).

Pilot Officers to be Flying Officers.—C. Littlejohn; Aug. 19, 1919. A. A. W. Barron (since granted Short Service Commn.), B. Cheesman, M.B.E., H. P. G. Leigh, H. Little, H. Stafford, S. Upton; Oct. 1, 1919. Sec. Lieut. (Hon. Capt.) R. Alston to be Lieut. without pay and allowances of that rank; April 2, 1918 (since demobilised) (*Gazette* of July 29, 1919, to stand).

Pilot Officers to be Flying Officers, without pay and allowances of that rank.—A. Elson; Aug. 4, 1919 (since demobilised). W. R. Jenner; Aug. 27, 1919. W. B. Chippendale (since demobilised), G. Croft, F. Wiltshire; Oct. 1, 1919. Lieut. (actg. Capt.) N. J. Wallis (Capt. Can. Eng.) relinquishes his temp. R.A.F. commn. on ceasing to be employed; July 15, 1919.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

Lieut. G. A. Gillings relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 5.

The name of Sec. Lieut. (actg. Lieut.) Leonard Thomas Sanderson, D.S.M., is as now described, and not as stated in *Gazette* of Nov. 22, 1918.

## Medical Branch

Two officers transfd. to Unemployed List.

Capt. (actg. Maj.) A. A. Atkinson (R.A.M.C. (S.R.)) relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain rank of Maj.; May 4.

## Memoranda

Lieut.-Col. (actg. Brig.-Genl.) F. G. Willock, C.B.E., D.S.O., to be Hon. Col.; Nov. 7, 1918 (since demobilised).

(Then follow the names of 93 Cadets granted hon. commns. as Sec. Lieuts.)

London Gazette, May 14

## Permanent Commissions

The following are granted permanent commns. (Chaplain's Branch), with effect from Aug. 1, 1919.—Rev. B. W. Keymer, O.B.E., Rev. H. McCalman, M.C., Rev. G. H. Collier.

## Short Service Commissions

The following are granted short service commns. (Chaplain's Branch), with effect from April 1.—Rev. A. A. Crawshaw, Rev. J. T. S. Law, Rev. J. H. P. Still, Rev. G. A. Davies.

## Flying Branch

Sec. Lieut. W. K. Cole relinquishes his commn. on ceasing to be employed and his permitted to retain his rank; April 15, 1919.

(Then follow the names of 21 officers who are transfd. to the Unemployed List under various dates.)

Squad. Ldr. H. Wyllie, O.B.E. (late Capt., Wilts R.), having retired from the Army and relinquished his R.A.F. commn., is granted the rank of Lieut.-Col.

The following relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank:—Lieuts. R. C. S. Hall; Jan. 2 (substituted for *Gazette* of Jan. 9). G. R. Moffoot, D.F.C.; March 15 (substituted for *Gazette* of March 23). G. Hood; May 14. Sec. Lieut. C. A. Songhurst April 29. Sec. Lieut. (Hon. Capt.) S. C. Savill (W. Yorks.) (T.F.); May 6. Pilot Officer (Hon. Flying Officer) A. A. McConnell, M.C. (temp. Lieut. (actg. Capt.), Durh. L.I.), relinquishes his R.A.F. commn.; Aug. 28, 1919.

The notifications in the *Gazette* of July 29, 1919, and April 6, concerning Lieut. S. W. Taylor, M.C., A.F.C., are cancelled.

*Gazette* of May 2, 1919, concerning Sec. Lieut. W. K. Cole is cancelled.

## Administrative Branch

(Then follow the names of 6 officers who are transfd. to the Unemployed List under various dates.)

Flight Lieut. A. W. MacIlwaine (late Paymr. Lieut. Com., R.N.) relinquishes his R.A.F. commn. on retirement from the Navy, and is granted the rank of Maj.; April 27. Lieut. R. H. Sturgeon is placed on the retired list; May 15.

## Technical Branch

Flying Officer T. S. Pearson, M.C. (Lieut. R.F.A.), relinquishes his temp. R.A.F. commn. on return to Army duty; May 7.

(Then follow the names of 9 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. H. R. Powell is placed on the retired list; May 15. The rank of Sec. Lieut. (Hon. Lieut.) S. D. Pegram is as now described and not as stated in the *Gazette* of March 26.

## Medical Branch

L. Game, M.R.C.S., F.R.C.P., is granted a temp. commn. as Flight Lieut.; April 21. Flight Lieut. T. D. J. A. Fuller relinquishes his commn. on ceasing to be employed, and is permitted to retain the rank of Capt.; April 16. Lieut. G. G. Coury, V.C., is transferred to the Unemployed List; April 30, 1919.

## Memoranda

(Then follow the names of 3 Overseas Cadets granted temp. commns., 49 Canadian Cadets granted hon. commns., and 31 Cadets granted hon. commns. as Sec. Lieuts.)

The following Proby. Flight Officers are granted hon. commns. as Sec. Lieuts.: J. H. Knight; Jan. 20, 1919. E. F. S. Smyth; Jan. 22, 1919. D. D. Davison; March 15, 1919. R. Whalley; April 12, 1919. P. Wood; April 14, 1919. A. L. Stephens; April 17, 1919. J. N. Banks; May 15, 1919.

Capt. M. McKenzie Wood, O.B.E., having relinquished his R.A.F. commn. is granted the rank of Maj.

## An Airship Claims Prize

In the Prize Court last week, before the Right Hon. Sir Henry Duke, President, a claim was heard in respect of the destruction of the U.B. 115. Lieut. Walter Thomas, Arthur Bird, D.S.C., said that on September 29, 1918, he was in command of H.M.S. *Ouse*, and was acting as escort to convoy T.N. 9, with the following vessels: H.M. Airship "R. 29" (Flight Lieut. Godfrey M. Thomas), H.M.S. *Star* (Lieut. Ronald Neild Stuart, V.C., D.S.O.), and six armed trawlers. The "R. 29," when she was in lat. 55.13 N., long. 1.22 W., signalled that an oil patch was rising below her. Steps were at once taken to surround the position, and bombs and depth charges were dropped, followed by a vigorous bombardment. The airship later released a smoke ball and a vessel followed it and dropped other depth charges. The position was marked by a buoy, and oil covered a large area round for 36 hours after. Afterwards an obstruction was found on the bottom, and it was believed to be the wreck of the U.B. 115, which carried a crew of 37.

The President awarded £185.

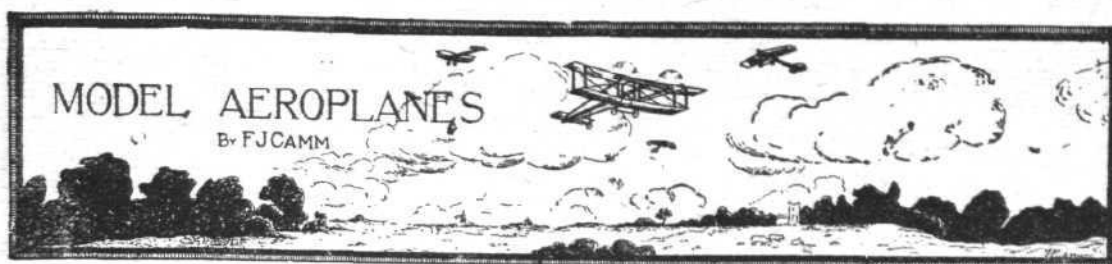
## The Aircraft Deal

THE Aircraft Disposal Co., Ltd., for whom Handley Page, Ltd., have been appointed managing agents, and who have taken over the whole of the surplus stock of aircraft and aircraft material from H.M. Government, announce that their Sales Department is now established at Regent House, Kingsway, London, W.C.2 (Telephone: Regent 5621; Telegrams: Airdisco, London) for the purpose of dealing with enquiries and orders, and from time to time offers for the disposal of the various materials will be circulated.

It is the intention of the Company to maintain a fixed price-list quoting definite prices for aeroplanes and engines from which a rebate will be quoted to all British Aircraft Manufacturers, British merchants and firms dealing in aircraft accessories and components.

In addition to aircraft and engines, there are immense stocks of magnetos, plugs, instruments, accumulators, electrical outfits, ball bearings, bolts, nuts, washers, etc., etc. All these have been manufactured to the Government specifications and are of the highest grade.





NOTE.—All communications should be addressed to the Model Editor.

### Designing a Model Aeroplane

THE lift of an aerofoil varies directly as the angle and as the square of the velocity; that is to say, double the angle and you double the lift; double the speed and you get four times the lift; halve the speed and the lift is reduced to one-fourth. Now at 40 miles an hour the weight borne by a square foot of surface is about 2.25 lbs. At 20 miles an hour, the lift per square foot will therefore be 0.56 lb., and at 10 miles per hour only 0.14 lb., or 2.24 ozs., will be carried—this when the angle of incidence is about 1 in 8, or 7° approximately, which is about the angle used in most of the well-known machines.

In models, I have found that such an angle is the greatest practicable—much finer angles being generally best; and as, with models, the difficulties of providing large surfaces are not so great as with the full-sized machines, angles of 1 in 10 to 1 in 15 will be found most suitable. There is another reason why finer angles can be used in models. Suppose we make a scale replica of, say, a Sopwith machine, we reduce the size of the machine by linear measurements, the area of surfaces as the square and the weight as the cube of the original. The model should therefore have better chances of success than the original, because the weight in proportion to surface is not so great. True, the speed is not so great—but the speed is not reduced by scale; a model one-twenty-fourth full size will fly easily at from one-fourth to one-eighth of the speed of the original; so it will be seen that less inclination and less power is required in proportion to size. Many of my own experimental models have flown at about 15 miles an hour in still air, and the lift has been 4.4 ozs. per sq. ft. of surface. Other models having finer angles of inclination have flown at higher speeds, but the pressure on the planes has been the same.

In designing models, it is not usually necessary to go deeply into mathematical calculation, because it is so very easy to vary the factors governing the success of the machine. The source of power (generally india-rubber) can be increased or reduced in quantity; angles of the aerofoils and the areas of same can be altered. But suppose we have a motor other than rubber, of known power and weight—which power and weight cannot be varied—and we wish to fit that motor to drive an aeroplane. The matter is then somewhat different, and we shall have to find out what is the proper area of surface to fit to the machine to support the weight. Suppose our motor is a piece of clockwork weighing, we will say, 4 ozs., we find by a formula which I shall give later that the clockwork is capable of giving at the propeller a thrust of 3.4 ozs.; we shall find presently, in addition to the thrust, the velocity which the motor is capable of giving to the machine. Now, as I have already stated, the theoretical ratio of lift to the drift of an inclined plane or aerofoil varies directly as the angle of inclination. Thus, if an aerofoil is placed at an angle of 1 in 10, the power required to drive it will be 1 oz. for every 10 ozs. carried—i.e., if the model aerofoil weighs 10 ozs., a pressure of 1 oz. will be sufficient to push and sustain it. If the angle be 1 in 15, then a thrust of 1 oz. will sustain 15 ozs.—and so on.

Now a single aerofoil is not a complete machine, and there are, therefore, resistances to be overcome other than that of a purely dynamic kind. There is that of the head resistance of the whole framework—which is pretty considerable; and that of skin friction, which (whatever may be argued regarding full-size machines) may be considered negligible in well-made models, especially those having polished wooden planes. It will be seen, therefore, that if we take say one in ten as our angle, the thrust required rises from one-tenth of the weight to one-fifth—or even as much as one-fourth. Designers usually adopt a standard for thrust of one-third or one-fourth; but on large aeroplanes there is the resistance offered by the area of the pilot's body, petrol tanks, etc. For models, since the speeds will be low, we may safely take the thrust at one-fifth of the weight.

Having, then, a thrust available of 3.4 ozs., we may drive and support with this a machine having a total weight—including the clockwork—of  $3.4 \times 5 = 17.0$  ozs. We now

require to know the velocity which the motor is capable of giving to the machine. This we shall arrive at presently, along with the thrust; but for the present we will assume it to be 12 miles an hour. Having then before us both the weight and the velocity, we can by the following find the plane area required:—

$$\text{Equation, } A = \frac{W}{\text{kor } V^2 \sin \alpha}$$

Where  $W$  = weight carried = 17.0 ozs., or 1.065 lbs.,  
kor = 0.005 for cambered surfaces, and 0.004 for flat planes.

$V$  = velocity in miles per hour = 12.

$\sin \alpha$  = angle of plane to the horizontal path of flight = 1.10th.

We have therefore  $\frac{1.065}{2 \times 0.005 \times 12^2 \times 1/10} = 7.39$  sq. ft. area.

This area may represent the whole surface, including elevators and tail, if one be fitted, or it may be taken as the area of the main surfaces only.

Before we can arrange how the area of surface arrived at in the foregoing is to be disposed, we have of course to decide whether the main aerofoils are to be at the leading end of the machine with the elevator tail behind, or at the rear with the elevator in front. I have given examples of both these types.

For the purposes of the theoretical machine we are now dealing with, we will assume that we are going to put the elevator in front and a pair of super-posed foils at the rear. Now, I have found that it may be taken as a very good rule that the area ratio of front planes to rear should be about 1 to 6. That being so, we take our total area—which we found was 7.39 sq. ft.—and divide it by seven, i.e., the sum of 6 and 1. We thus obtain  $\frac{7.39}{7} = 1.06$  sq. ft., approximately.

This is to be the area of the front plane. Now, subtracting this from 7.39 gives us 6.33 sq. ft., as the area of the main planes, or 3.165 sq. ft. for each aerofoil.

If the framework carrying the surfaces is made just sufficiently large and substantial to do its work properly, and is not needlessly heavy, the centre of gravity of the whole model will be found to lie on a transverse line some little distance in front of the leading edge of the main surfaces; that is, of course, before the motor is put on. The weight of the motor and propeller will probably shift the centre of gravity to a point a little aft of the leading edges.

To complete the design, we must calculate the weights of the various parts of the model. We have the weight of the motor, 4 ozs.; to this we may add, say, 1 oz. for the propeller and its attachments, bearings, etc. This 4 ozs. + 1 oz. must be deducted from the total weight of 17 ozs., leaving 12 ozs. as the weight of the aerofoils and framework. From this again, we take, say, 2 ozs. to allow for fabric, brads, wire, etc., leaving 10 ozs. for woodwork. The best way to arrange that this weight shall not be exceeded will be to sketch out the design, full size if possible, on paper, and measure up the cubic contents of all the parts. Then by means of a table of weights of different materials, which may be found in engineering works and pocket-books, the weight of the model may be found. If the weight thus arrived at exceeds the 10 ozs. allowed, the sizes of the parts must be reduced. For instance, suppose the whole framework and the frame of the aerofoils are to be made of birch, we find from a table that a cubic foot of that wood weighs 45 lbs.

or 720 ozs.; that is to say,  $\frac{720}{1728} = 0.4$  oz. per cubic inch.

Now suppose we find by measuring up the quantity represented in our sketched design that there are, say, 30 cubic ins., we know that we must reduce the sizes of some parts, because

$$\frac{10 \text{ ozs.}}{0.4} = 25 \text{ cubic ins.}$$

It may be thought that this is a long, tedious job, but it is both quicker and easier than making the framework foils, etc., and weighing them afterwards, only to find that considerable alteration is necessary.

(To be continued.)

## SIDEWINDS

MESSRS. C. C. WAKEFIELD AND CO., LTD., of Wakefield House, Cheapside, E.C. 2, the manufacturers of "Castrol," draw attention to the fact that their telephone numbers have now been changed to Central 1157 and 1158.

THE British Piston Ring Co., Ltd., have appointed Mr. Thomas B. Hamilton of 5, Fortfield Terrace, Upper Rathmines, Dublin, as their Irish representative.

MESSRS. AUTO-CARRIERS, LTD., inform us that they have recently investigated cases in which certain unscrupulous London motor dealers are offering 1920 A.C. models at a high premium. It appears that in several cases the cars are not 1920 models, and in every case Auto-Carriers wish to make it clear that their guarantee only operates when the car is purchased through an authorised A.C. Agent, who will naturally sell at the current retail price. A list of their agents will be forwarded by Auto-Carriers on request.

HIS many friends will be interested to hear that Capt. C. Howard Pixton is still going strong at Bowness-on-Windermere. He has opened the seaplane station as a garage and is specialising in light cars and motor cycles as well as catering for motor car and motor boat repairs. Motorists will also find stocks of tyres, accessories, oil and petrol, and cars are also available for hire. Incidentally, if anyone is considering the question of running an aerial passenger service from the Lake District, they may be interested to hear that half the seaplane station is to let, and he will be pleased to send particulars if they will apply to him at the above address.

OF the several machines which essayed the difficult course for the Grand Prix de Monaco, from Monaco to Bizerta, and Tunis and back, the only one which succeeded in finishing, the French Naval Air Service Tellier seaplane piloted by Lieut. de Bellot, was fitted with a 350 h.p. Sunbeam-Coatalon "Cossack" engine, of which large numbers were used in the French Naval Air Service throughout the war, and always gave most reliable and efficient service. These engines are similar to those installed in the later British Airships.

OWING to increased quantities of heavy and bulky freight being now carried to and from Paris by the Handley Page aeroplanes, a number of specially-constructed freighters will soon be added to the machines employed on the Handley Page Continental Air Services, which are run in conjunction with Cie. Messageries Aériennes of Paris. They will be known as the O/11 type, and will have a large freight hold with a passenger cabin for two or three at the back of it. There will be, as hitherto, two passengers carried in the nose of the machine in front of the pilot and mechanic.

Season tickets for ten (not twelve as stated last week) single flights between London and Paris can be purchased for £120.

## COMPANY MATTERS

### Fellows Magneto Co., Ltd.

THE report for 1919 states that, after allowing £4,615 for depreciation, etc., there is a net profit of £22,644. An increase of the capital to £500,000 was sanctioned in December, 1919, to finance the then rapidly expanding output, to meet the cost of enlarging the factory, and to provide the automatic-machinery required for mass production. The profits realised to date by the employment of the additional capital have more than justified these past and present issues of capital. When the 250,000 ordinary shares now offered for sale are allotted, a sum approaching £90,000 will stand to the credit of reserve account. The paid-up capital will then amount to £352,500. The 8 per cent. dividend on the cumulative participating preferred shares for 1918 has been paid, absorbing £9,255. The directors recommend a participating dividend at the rate of 1½ per cent. per annum, less tax, on the preferred shares, making 9½ per cent. for 1919, and a dividend of 25 per cent., less tax, on the ordinary shares. Both dividends will be payable to shareholders whose shares were entitled to dividend on December 31, 1919, *pro rata* to the amounts and periods during 1919 for which such shares rank for dividend. This will absorb £17,872, leaving £5,772 (including £1,000 brought forward) to be carried forward, subject to excess profits tax.

### New Pegamoid, Ltd.

THE directors have declared an interim dividend for the six months ended March 31, 1920, at the rate of 10 per cent. per annum, less tax, payable June 18, 1920.

## PUBLICATIONS RECEIVED

*Abstract of Report No. 90. Comparison of Hester Fuel with Export Aviation Gasoline.* By H. C. Dickinson, V. R. Gage and S. W. Sparrow, Bureau of Standards National Advisory Committee for Aeronautics, Navy Building, 17th and B. Streets N.W., Washington, D.C., U.S.A.

*R.F.C. H.Q., 1914-1916.* By Maurice Baring. London, G. Bell and Sons, York House, Portugal Street, W.C. 2. Price 8s. net.

*Descriptive Booklet (in Spanish) of the "Cellon" Dope Works.* Cellon, Ltd., 22, Cork Street, W. 1.

*Aluminium.* By George Mortimer. Pitman's Common Commodities and Industries. London: Sir Isaac Pitman and Sons, Ltd. Price 2s. 6d. net.

*Report No. 43. Synopsis of Aeronautic Radiator Investigations for the Years 1917 and 1918.* National Advisory Committee for Aeronautics, Navy Building, 17th and B. Streets, N.W., Washington, D.C., U.S.A.

*Report No. 76. Analysis of Fuselage Stresses.* National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

*Rugby Engineering Society: Proceedings, Session 1918-19.* Vol. XIII. The Rugby Engineering Society, Rugby.

## AERONAUTICAL PATENTS PUBLISHED

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motor

### APPLIED FOR IN 1915

Published May 20, 1920.

17,067. PAGE. Aeroplanes.

### APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 20, 1920.

- 1,446. J. W. RAPP. Aeroplane fuselage. (122,647.)
- 1,447. J. W. RAPP. Ribs for aerofoil frames. (122,648.)
- 2,342. J. J. MAYROW. Aerofoils, wings, etc. (141,827.)
- 3,466. L. YOUNG. Rotary air propellers. (141,836.)
- 3,614. F. F. SIMONS. Flying-machines. (141,837.)
- 7,424. E. B. LVBOSHEZ. Control and stability devices. (141,875.)
- 9,590. S. W. STAMPER. Fuselages. (141,899.)
- 12,666. H. R. BUSTEED. Emergency flotation gear. (141,934.)
- 16,392. G. C. BROWN. Heavier-than-air craft. (141,970.)
- 19,239. W. C. RUSSELL. Airscrews. (141,989.)
- 20,939. S. WILEY. Parachute flares to be dropped from aircraft. (142,003.)
- 28,905. A. V. ROE. Controlling-gear for aircraft. (135,835.)

### APPLIED FOR IN 1920

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 13, 1920.

- 4,083. J. J. M. A. E. SCHNEIDER. Radiators of aeroplane engines. (141,650.)

Published May 20, 1920.

- 168. W. DE F. CROWELL. Wind-shields (142,060.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxvi, xxvii and xxviii).

## NOTICE TO ADVERTISERS

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